South Gloucestershire Council Local Plan 2020 Site Submission Form

GUIDANCE ON COMPLETING THIS FORM

Please return this form if you are suggesting a site to be considered in the South Gloucestershire Local Plan 2020. Previously submitted sites are available to view on an online map at:www.southglos.gov.uk/callforsites

For each site please complete a separate form and provide a map that clearly and accurately identifies the site boundary.

Completed forms and site location plans should be emailed to: **policy.consultation@southglos.gov.uk.**

Identifying a potential site does not infer that the council in any way supports the development of the site. Sites will be assessed through the plan making process and will be subject to normal planning procedures.

The information collected as part this consultation will also be used by the council in accordance with the data protection principles in the Data Protection Act 1998. The purposes for collecting this data is: to assist in plan making; and to contact you, if necessary, regarding the planning consultation process. Some of the data may be made public as it will form part of the evidence base used to inform the creation of planning policy documents. The above purposes may require public disclosure of any data received on the response form, in accordance with the Freedom of Information Act 2000.

The purpose for holding your personal information is to assist in preparing development plan documents and supporting supplementary planning guidance and advice; and to contact you, if necessary, regarding the planning consultation process relating to their preparation. In order to provide the above service we may share your information with the following:

- Other South Gloucestershire Council departments
- External consultants working on behalf of South Gloucestershire Council
- Other Local Planning Authorities (LPAs)
- Other groups preparing statutory development plans relevant to South Gloucestershire

Please follow the link to our Privacy Policy and Data Protection Policy to find out more.

1. HAS THE SITE PREVIOUSLY BEEN SUBMITTED TO THE COUNCIL?

Previously submitted sites are available to view on the online map accessible from: www.southglos.gov.uk/callforsites (Click on the site to see the site reference number and information previously submitted).

		Please enter the relevant Site Reference number from www.southglos.gov.uk/callforsites
Has this site previously been submitted?	Yes	SG114

If the site has already been submitted, how does the information provided in this form change the information you have previously provided to us?

More up-to-date information available set out in Covering Letter & Promotion Document

2. YOUR DETAILS

Name	[redacted]
Company/Organisation (if applicable)	
Address	[redacted]
Telephone	[redacted]
Email	[redacted]
Status (please tick all that apply	Owner of (all or part of) the site [ ] Land Agent [ ] Planning Consultant [x] Developer [ ] Amenity/ Community Group [ ] Local Resident [ ] Registered Social Housing Provider [ ] Other (please specify) [ ]
If acting on behalf of Landowner / developer please provide client name and address details:	[redacted]
I (or my client)…	Is sole owner of the site [x] Owns part of the site [ ] Do not own (or hold any legal interest in) the site whatsoever [ ]
If Owner/Part Owner, have you attached a title plan and deeds with this form?	Yes [ ] No [x]
If you are not the owner, or own only part of the site, do you know who owns the site or the remainder of it (please provide details)?	Yes
Does the owner (or other owner(s)) support your proposals for the site?	Yes [x] No [ ]

3. SITE DETAILS

Site Address (including postcode where applicable)	Woodlands Golf & Country Club, Trench Lane, Almondsbury, Bristol, BS32 4JZ
Site Area (Hectares)(if known)	109.4
Current land use(s)	Golf Course
Adjacent land use(s)	Agricultural Land, Motorway, Residential
Relevant planning history (if known)	

Please tick box to confirm you have provided a site plan [X]

4. POTENTIAL USES & CAPACITY

Suggested uses (please tick all that apply and where mixed use indicate % of overall site for each use)

USE		**Capacity (number of units) and indication of possible residential tenures, types and housing for different groups**
Residential		1,750
Residential – Self-Build and Custom-Build		Can be explored

USE		**Floorspace (m^2) / number of floors/pitches / notes**
Office, research & development, light industrial (B1)		See representations document
General industrial (B2) / warehousing (B8)		See representations document
Sports / leisure (please specify)		See representations document
Retail		See representations document
Gypsy and Travellers / Travelling Showpeople sites		
Other (please specify)		

Additional notes about potential uses:

Please see covering letter, promotional document and plans.

5. SITE SUITABLITY ISSUES

Question		Further details including details of further studies undertaken / mitigation proposed
Does the site have any physical constraints (e.g. topography, access, severe slope, vegetation cover etc.)?	No	
Is the site subject to flooding?	Yes / No	See representations
Is the site affected by 'bad neighbour' uses (e.g. power lines, railway lines, major highways, heavy industry)?	No	
Is there a possibility that the site is contaminated?	Yes / No	See representations
Can satisfactory vehicular access to the site be achieved?	Yes	See representations
Has the Highways Agency been consulted?	No	
Is the site subject to any other key constraints?	No	

UTILITIES / INFRASTRUCTURE PROVISION
Please tell us which of the following utilities are available to the site

Mains water supply	[x]	Mains sewerage	[x]
Electrical supply	[x]	Gas supply	[x]
Landline telephone	[x]	Broadband internet	[x]
Other (please specify below)	[ ]		

Please provide any other relevant information relating to site suitability issues:

6. SITE AVAILABILITY ISSUES

Question		Comments/further details
Are there any legal/ownership constraints on the site that might prohibit or delay development of the site (e.g. ransom strip/covenants)?	No	
Must land off-site be acquired to develop the site?	No	
Are there any current uses which need to be relocated?	No	
Is the site owned by a developer or is the owner willing to sell?	Yes	[redacted] have an agreement with the [redacted] to promote the site for development.

Estimated delivery rate: When do you think the site would come forward for development? (Where a development will be phased over more than one period please indicate this)

Within the next 5 years	6-10 years	11-20 years
150	750	1,350

Do you have any information to support when the site will come forward and its phasing? Please consider suitability, achievability and constraints.

The land is within [redacted] have an agreement with them to promote the land for development. They are confident they can get the site to market quickly and efficiently.

7. SITE ACHIEVABILITY ISSUES

Question		Comments/further details
Are there any known significant abnormal development costs (e.g. contamination remediation, demolition, access etc.)? If yes, please specify.	No	
Does the site require significant new infrastructure investment to be suitable for development? If yes, please specify.	Yes/No	See separate reps.
Are there any issues that may influence the economic viability, delivery rates or timing of the development? If yes, please specify.	No	
Has a viability assessment / financial appraisal of the scheme been undertaken?	No	
Have any design work studies been undertaken?	Yes	See separate reps.

8. ADDITIONAL COMMENTS

If necessary, please continue on a separate sheet and attach to this form.

Please see submitted Call for Sites Ltr, promotion document and plans.

Completed forms, site location plans and any supporting information (Title and deeds etc.) should be emailed to: **policy.consultation@southglos.gov.uk.**

ON BEHALF OF SOUTH WEST STRATEGIC DEVELOPMENTS (SWSD) LTD

REPRESENTATIONS TO THE SOUTH GLOUCESTERSHIRE LOCAL PLAN PHASE 3 CONSULTATION – 'TOWARDS A PREFERRED STRATEGY'

WOODLANDS GARDEN COMMUNITY

February 2024

grassroots PLANNING

grassroots PLANNING

Bristol North Baths
Gloucester Road
Bristol
BS7 8BN
t: 0117 930 0413 w: grassroots-planning.co.uk

REPORT CONTROL

Project:	Woodlands Garden Community
Report Type:	Local Plan Representations
Client:	SWSD
Our Reference:	354/A3/CC/MK
Date:	16th February 2024
Version:	V1

COPYRIGHT
This document must not be copied or reproduced in whole or in part without the written consent of Grass Roots Planning Ltd

1.0 INTRODUCTION

1.1 On behalf of our client, South West Strategic Developments Ltd and the landowners, Grass Roots Planning have been instructed to prepare and submit representations to the South Gloucestershire Local Plan 'Phase 3 – Towards a Preferred Strategy' (the 'EPS') consultation document, in relation to a development site known as 'Woodlands Garden Community', at Woodlands Golf Course, Trench Lane, Almondsbury.

1.2 We have been promoting the site on behalf of SWSD since 2016 via the previous Joint Spatial Strategy (JSP), Spatial Development Strategy (SDS) and Local Plan, and are pleased to see that the site has now been selected as a preferred allocation to meet housing and community needs in South Gloucestershire, which in turn will also support Bristol, given it lies on the urban edge of the city where demand for housing is high and affordability challenging.

1.3 Woodlands Garden Community has evolved over the last 8-9 years in response to extensive levels of technical work and masterplanning, to form what we consider to be a sustainable urban extension to Bristol – comprising a mix of market and affordable housing (around 1800 new homes), specialist residential accommodation, new primary school, local centre, and strategic green infrastructure.

1.4 Infrastructure items required have previously been costed and confirmed viable, and will be fully funded as we will go on to discuss. SWSD are a land promoter with an excellent track record of assembling land and securing planning permissions with a clear framework for future development, that delivers real community benefits and high standards of design quality.

1.5 As such, we consider that the site is an appropriate location for development to meet the future needs of South Gloucestershire and we look forward to seeing the next iteration of the plan with Woodlands Garden Community (WGC) included within it.

1.6 Notwithstanding the above, in the interests of soundness of the next stage of plan and evidence base, we have made some broad comments on the housing requirement, spatial strategy and some site-specific allocations, as well as set out in further detail how we are responding to the key issues raised by the Council in terms of the emerging evidence base which underpins the proposed allocation at WGC.

2.0 HOUSING NEED & SUPPLY

Housing Need

2.1 We are pleased to see that SGC is not 'shying away' from the use of the Standard Method as a starting point to determine the plan's housing requirements, and is intending to deliver the homes that are required to meet the existing, and future, community's needs – at least 20,490 homes over the 15 year plan period (2025 – 2040), equating to 1,366 homes per annum.

Local Housing Need Assessment 2023

2.2 The Local Plan is supported by a Local Housing Needs Assessment (December 2023) (LHNA) prepared by ORS. We have a few salient points to note:

- The paper indicates in paragraph 4.66 that the overall affordable housing need is 18,468 households between 2025 – 2040, equivalent to 1,231 per year. This is equivalent to 90% of the overall housing target currently being pursued by SGC and is a critical issue that requires addressing. As such, consideration should be given to whether a higher housing figure would support more affordable homes being delivered. If SGC has considered this option but has agreed that overall it would not be possible, this ought to be made clear in the next stage of the plan-making process.
- Whilst student housing is considered to some degree, it does not appear that any consideration has been given to what happens if student numbers increase at UWE and how this may impact the requirement for student housing and HMOs in the locality. This ought to be given further consideration in the next stage of the plan.
- Inward migration does not seem to have been thoroughly considered, other than being referenced in paragraph 2.27 of the LHNA. We question whether further examination of this issue is warranted in light of the significant employment zones in Filton and Emersons Green which provide a large amount of the wider region employment opportunities, which may encourage more people to live in the area w where they currently commute in for work.

2.3 In our view, during the next stage of the plan process we consider some further work on the LHNA is warranted to ensure that a justified housing requirement can be realised, with it being effective at reducing the affordable housing waiting list and providing the homes that people need.

Bristol's Overspill Need

2.4 We note a broadly positive response in respect of Bristol's unmet housing need, which states at paragraphs 3a.40 – 3.a.44 that whilst unmet need has not yet been considered, Bristol City Council have written to the neighbouring authorities to consider whether it is possible for some additional allocations be made to help address this serious and significant issue.

2.5 Having reviewed the Bristol Local Plan, we note that in November 2022 a Local Housing Needs Assessment was undertaken by Opinion Research Services (ORS) which suggested that the city centre uplift was not a reflection of the city's actual needs. The standard method figure, plus the 35% uplift required in urban areas, resulted in an overall need of circa 3,380 dwellings per annum which the authority considers is a considerable over-estimate and significantly above anything that has been delivered in the city's boundaries for many years.

2.6 As such, ORS suggest that the minimum derived figure should be 2,503 dwellings, with an uplift applied for migration and household formation patterns. This results in a housing need figure of 2,600 dwellings per annum.

2.7 Whilst we do not seek to comment in significant detail on these figures, it should be noted in respect of the Bristol Local Plan that:

- The current analysis by ORS fails to consider any previous under-supply within Bristol which may have dampened housing projections – this is a departure from the previous assessment in 2022;
- The PPG requires the 2014-based projections to be used – BCC are using 2018-based projections which have been identified as not being appropriate to identify a housing requirement that properly reflects affordability factors;
- The assessment work fails to take into account the 35% uplift required by the Government, despite the fact that affordability (house price to income affordability) has significantly worsened within Bristol over the last 25 years – and continued to remain at the same level in 2022 despite the rest of the country improving;
- The paper also fails to take into account whether any increase in the number of university students studying in the city would result in an increase in housing numbers;
- The economic potential of the area, including significant employment schemes as well as infrastructure projects, and their impact on job creation, has not been considered in respect of how that might translate to added pressure on the housing market; and finally
- The evidence does not consider in any detail whether an increase in the housing target would assist in meeting affordable housing need, of which it is understood that there are circa 16,000 households currently on the waiting list in Bristol City.

2.8 Notwithstanding the above regarding the overall housing requirement, paragraph 6.7 of the Bristol City Council Local Plan document states:

Taking into account the land that can come forward for housing development and the places which are reserved for other necessary land uses, the level of housing development which can be accommodated in Bristol is assessed to be 1,925 homes per year on average up to 2040.

2.9 In terms of the figure of 1,900 homes that has been put forward, this has largely been derived on previous housing delivery rates in Bristol. In recent years, the mix of homes delivered has been an 80/20 split in favour of flats over houses. The Strategic Housing Market Assessment (SHMA) which supports the Bristol Local Plan evidence base suggests that a 60/40 split is required to meet identified housing need – therefore in our view, the capacity put forward is overstated if BCC intend to deliver the mix required by the SHMA as providing more houses rather than flats will mean lower density will be delivered on the Local Plan sites, and in turn more land would be required. Therefore, either BCC will deliver more flats which are not necessarily required in respect to mix, which will result in more family homes being required on the edge of the city; or they will deliver the family homes required in the centre and then seek to meet additional housing need outside of its boundaries. Either way, this will likely result in additional unmet needs that will need to be delivered in the surrounding authority areas in accordance with paragraph 11 b) of the NPPF.

2.10 Accordingly, it is clear that there are significant issues related to unmet needs in Bristol, and this remains to be debated at their own Local Plan Examination. In turn, this may affect the level of development required within SGC's boundaries. In our view, a pragmatic response would be to consider some form of uplift now to help address the paragraph 11b) requirement to provide for unmet needs in adjacent authorities.

2.11 Even taking the above figures at face-value, based on the lower housing needs figure derived by ORS – which equates to 2,600 dwellings per annum, and with average delivery rates sitting at 1,925 dwellings per year, it is anticipated that there would still be an unmet need of 675 dwellings each year up to 2040, which should be met within the neighbouring authority boundaries.

2.12 Given the deficit identified in housing need, Bristol City Council (BCC) wrote to the surrounding authorities (dated 31st October 2023 and referred to as Appendix 1 within the 'Planning for Strategic Cross Boundary Matters' paper which supports the emerging Local Plan) asking that consideration be given to aiding them in delivering their unmet need.

2.13 BCC, whilst recognising that each neighbouring authority's first responsibility is to meet its own local housing needs, states:

Taking the above housing-related matters into account, the city council requests that [authority name] explores through its local plan process whether it could accommodate a proportion of Bristol's unmet locally derived housing need as set out above.

2.14 Given the strong interrelationship between the two authorities, in both strategic housing market and functioning economic market terms, it is our view that some of Bristol City's need is considered as part of the next stage of the plan process. Both authorities would benefit from providing additional housing to help meet Bristol's requirement as this has an impact not only in terms of its social value, but also economic value, in terms of locating people near to their place of work. Assisting in meeting Bristol's needs would be a positive aspiration of a Council that is so intrinsically linked with it, truly seeking to deliver a step change in housing delivery for local people.

2.15 Accordingly, we suggest that further research needs to be done to try and accommodate some of Bristol's housing needs in the emerging plan, in the interests of the Duty to Cooperate and good planning. The Inspector for the Core Strategy clearly identified that a review of the plan should have been undertaken by 2018 to account for Bristol's unmet need, given the clear interlinkages between the Housing Market Areas – whilst this may not affect the housing requirement for SGC a boost in supply would support this objective.

Components of Housing Supply

2.16 A Local Plan should set out a clear supply and associated projected trajectory of development of housing over its temporal scope. Furthermore, the recent changes to the NPPF (see paragraph 76) make it clear that it is important that Local Planning Authorities demonstrate a five-year housing supply at the point of adoption of their Local Plan.

2.17 Having reviewed the various components of the supply anticipated to come forward over the next 15 years, we provide brief commentary on the following in the interest of soundness and effectiveness.

2.18 At the current time it is acknowledged that no final choices have been made on the preferred allocations, with some options being considered. However it is critical that SGC at the Regulation 19 stage makes it clear what the overall housing need is, the sites which are proposed for allocation, the numbers to be delivered within the plan period and beyond, and the overall total. An anticipated trajectory would also be beneficial to show how the supply

would be front loaded and a mix and balance of sites achieved to ensure the new requirement to demonstrate a deliverable 5yr supply is achieved.

Existing Commitments

2.19 We note that SGC refers to the latest housing trajectory, and states that there would be 10,387 new homes which would be built between 2025 and 2040, based on 7,687 homes coming from large sites (10 homes or more) and 210 dwellings per year from small sites / windfalls (albeit this adds up to 10,837 rather than 10,387) (para 3a.15).

2.20 The authority goes on to confirm that they will not be consulting on existing commitments – whilst we agree with this, we do suggest that a discount should be applied for any non-implementation or future lapsed permissions, in the region of 10-15%, which is commonplace in other Local Plans where a detailed assessment of the supply from existing commitments has not been undertaken which is the case here. At this stage, it is difficult to understand from the current housing trajectory how the figure of 10,387 dwellings was derived, and whether this has been applied or not – in the next iteration of the plan we suggest this is clarified.

Windfall Capacity

2.21 We consider that the minor increase of 20 homes per annum for windfall capacity is appropriate, given the evidence set out in the Small Sites Windfall Topic Paper 2023.

Brownfield Sites / Urban Capacity

2.22 We are pleased to see various brownfield allocations quantified within the emerging Local Plan – this is significantly better than a theoretical capacity put forward as part of the JSP. We have three broad comments to make on this element of the supply.

2.23 Firstly, there appears to be a number of sites which are under 10 units set out within Table 1 of the report (pages 56 and 57 of the consultation document) and therefore we question whether this is double counting in respect of windfalls, the figure for which is based on the historic delivery from sites of that scale in the past.

2.24 Secondly, whilst we applaud the aspirations for Yate Town Centre's regeneration, caution needs to be given to the fact that the land is within multiple ownerships, and some owners may not be willing to sell up and redevelop the area; and it will rely on both significant public and private sector funding to come to fruition (estimated £300 – £600 million), the sources of which are not yet fully evidenced.

2.25 Lastly, we agree that it is reasonable to not include those sites / areas which are uncertain for development – such as UWE, Filton Airfield, Parkway Station and Kingswood Town Centre. This is because the potential number of homes coming forward on these sites is very difficult to discern without a detailed masterplan underpinned with technical evidence. These sites could however support the 'boost' in supply required by the NPPF in future years.

Greenfield Allocations

2.26 We have provided some commentary on some specific site allocations currently forming part of the emerging strategy:

- The Quarters Colony Farm – 70 dwellings: We are concerned that this site is not particularly well related to existing facilities and whilst a local centre will be provided within the adjacent proposed Woodlands Garden Community Site (Ref: SG114), consideration needs to be given to the distances travelled along roads that are not particularly suitable at the current time for pedestrian use. Further to this the site is currently used for grass pitches/playing fields and their loss would likely result in an initial objection from Sport England if they are not to be replaced, so any allocation would need to be connected to alternative provision or a robust assessment of why there is no need for them.
- Land at Hortham Lane, Almondsbury – 30 dwellings: We are concerned that this site is somewhat disjointed from the rest of Almondsbury and raises similar issues to the above in terms of connectivity and accessibility.
- Land on the south side of Gaunt's Earthcott Lane (EPS-SV5) and land off Gaunt's Earthcott Lane (EPS-SV7) – We agree that these sites should be beyond the plan period given their location adjacent to Woodlands Golf Club and the need for sustainable access to facilities needing to be delivered via, and on, this adjacent site. However, we would also question whether these sites are suitable for 280 homes given that SGC will be looking to adopt a new defensible Green Belt boundary to the south of this location – in our view it would be better that this element of the proposals gave way to landscape buffering (or possibly gypsy and traveller provision).
- The Old Vicarage, Alveston/Land north of A38, Alveston – 46 dwellings: We are concerned that this site is not deliverable due to the number of trees and other boundary features present on site, meaning that it would be extremely difficult to deliver 46 homes here, as well as other measures such as Biodiversity Net Gain. We consider that there are other sites within Alveston that would be more suitable for development.
- Land north of Berkeley Vale Motors – 16 dwellings: Ball strike needs to be considered given the proximity of Thornbury Cricket Club. Any development here should not displace existing users of this site.

- We support the development of Charfield at the current time, but should there be changes to the status of the re-opening of the railway line, we would no longer support the significant allocation of land in this area.
- We support the development of smaller settlements such as Rangeworthy and Cromhall due to the current transport issues faced within the area. It is noted that the number 84/85 bus service is due to be rescinded in April 2024 which will have an impact on the ability for local communities to travel sustainably. It is our view that the provision of development could sustain and enhance this service significantly to allow it to be retained along the new WESTLink Rapid Demand Response Service.

Deliverability

2.27 Paragraph 76 of the Framework sets out that Local Plans should identify a five-year supply of specific and deliverable sites at the point of concluding an examination, if the Plan is to offer protection against the application of the tilted balance. This would obviously be beneficial to the Council and provide greater confidence in the plan making system.

2.28 Achieving this requires the Council to select a broad portfolio of sites that contain a mix of smaller sites that require minimal infrastructure interventions to be deliverable in the first 5 years of the plan, and other larger sites that after infrastructure is in place, which can deliver a reliable stream of housing across the latter parts of the plan. In respect of Woodlands Garden Community, it is acknowledged that this is a large-scale strategic site however we anticipate that homes would be able to come forward in the first half of the plan period, as we will go on to discuss. We also welcome the pragmatic approach SGC are taking to larger sites by spreading delivery from them into the next plan period, where evidence exists to suggest that is appropriate or the promoters/developers of such sites have not evidenced why a different approach should be taken.

2.29 The inclusion of a detailed trajectory within the next version of the plan could set this all out more clearly.

3.0 SPATIAL STRATEGY

3.1 In respect of the planning strategy, we previously submitted a significant amount of evidence in relation to the Joint Spatial Plan proposals, which highlighted our concerns with the strategy being pursued at that time – namely that allocating land on the peripheries of SGC would result in car-borne development and increased CO_2 emissions when compared to alternative spatial options.

3.2 We do not seek to repeat that information here, but we are pleased to see that our evidence appears to have been taken into account and the Council is allocating the majority of housing land on the urban edge of Bristol, where there are significant numbers of jobs, active travel options, and where demand for housing is greatest. Second to this, we consider that it is appropriate to allocate smaller amounts of housing within existing towns and villages, to support and sustain them, particularly where there are already existing facilities. Lastly, we support the provision of land at Charfield provided that the reopening of the train station is supported by funding and that maintains a rail service in this location. Without this critical infrastructure in place the allocation of a significant amount of land would be unsustainable.

3.3 Justification was given previously for releasing Green Belt land in SGC, in the form of exceptional circumstances, and we consider that given the worsening housing crisis this remains to be the case. However, such Green Belt land should be sensitively released in locations which would not result in significant adverse landscape impacts, which require minimal infrastructure support to ensure timely delivery and in locations which can be made sustainable – such as at Woodlands Garden Community.

3.4 We support paragraph 5.9 of the Local Plan consultation document which states:

'The emerging preferred strategy for South Gloucestershire in summary, seeks to locate development where it can contribute to reducing the impacts of, and on climate change, for example by reducing the need for cross Green Belt commuting and supporting the commitment for decarbonising travel'.

3.5 We agree that the Green Belt should not be sacrosanct and prioritising this over very important aspects of sustainability objectives, such as transport, would be inappropriate.

3.6 Locating development on the edges of South Gloucestershire away, for example, from the Metrobus and other public transport links would result in an adverse impact with many residents needing cars in order to commute and/or to access day-to-day services.

The Revised NPPF

3.7 The NPPF was revised in December 2023. Among a number of policy changes, we note that paragraph 145 of the NPPF now states:

'Once established, there is no requirement for Green Belt boundaries to be reviewed or changed when plans are being prepared or updated. Authorities may choose to review and alter Green Belt boundaries where exceptional circumstances are fully evidenced and justified, in which case proposals for changes should be made only through the plan-making process.'

3.8 Whilst there is no requirement for Green Belt boundaries to be reviewed and changed, in the interests of good planning and sustainable development in SGC we consider this to be absolutely critical to the success of the Plan and the West of England area as a whole. We consider that there are exceptional circumstances to release Green Belt land and the accompanying work set out in the Sustainability Appraisal demonstrates this. This is the best way to provide the opportunity to decarbonise travel and improve existing infrastructure.

3.9 Paragraph 159(b) of the NPPF makes clear than in order to tackle climate change:

'New development should be planned for in ways that …
(b) can help to reduce greenhouse gas emissions, such as through its location, orientation and design…'

3.10 Furthermore, paragraph 11 b) still makes it clear that authorities should: '*as a minimum, provide for objectively assessed needs for housing and other uses, as well as any needs that cannot be met within neighbouring areas*'; as SGC has identified, achieving this requires the release of Green Belt land if sustainability objectives are to be realised in accordance with paragraph 159.

3.11 We therefore do not consider that the revised NPPF significantly impacts the emerging policy framework or the procedural approach for preparing the new Local Plan. We agree with meeting the area's objectively assessed need in full and that this warrants targeted, Green Belt land release to avoid delivering unsustainable development that would exacerbate current issues such as congestion and private car use in the area.

3.12 We also do not consider that the changes should warrant any pause in plan-making whilst awaiting further clarifications from the Government or a new NPPF to be released. The Written Ministerial Statement that accompanied the NPPF stated that *'some local authorities have paused plan making in recent months. That is not good policy, lets communities down and we*

have warned of the consequences.' The current Secretary of State, also commented in his speech to the RIBA that the Government would "not tolerate" authorities that fall behind in their Local Plan making.

We therefore strongly support the Council's aim of continuing with their plan, which they have been proactively progressing over recent months

4.0 PROPOSED POLICIES – COMMENTS

4.1 Below we have set out our comments on certain specific policies set out within the emerging Local Plan. We should note at this stage that a careful balance needs to be struck between seeking appropriate levels of information, rather than unrealistic and unnecessary technical work at validation/outline stage – this additional cost not only increases risk for developers, but also significantly increases the cost of delivery; in turn putting upward pressure on house prices and affecting site viability.

Energy & Sustainability

4.2 We fully support the transition to a low carbon economy however we have concerns regarding the current wording of the 'Energy Management in New Development' policy (intended to replace policy PSP6 of the current Local Plan).

4.3 The current wording of the policy puts developments at risk in terms of viability and significantly exceeds current Building Regulations which have only just come into effect in terms of minimising CO2 emissions.

4.4 We have significant concerns regarding this policy and standards that it expects residential development to accommodate. The Government has ambitious targets that are set out in building regulations and these are set to change in accordance with a step change towards zero carbon.

4.5 Many Councils are seeking to accelerate beyond the government trajectory with little evidence to suggest this will not cause significant viability problems in respect to residential development. The national standards have been carefully formulated and provide a consistent measure that developers can ensure that their products adhere to on a UK wide basis. Arbitrarily setting alternative targets in different parts of the country is inappropriate as it undermines this consistency and clarity.

4.6 Such policies are also inappropriate as they 'double up' on legislative requirements by adding a further layer of complexity on an issue that is best dealt with via building regulations in a consistent manner across the UK.

4.7 Additionally, consideration needs to be given to how the requirements of this policy might be satisfied at outline planning application stage – we have experienced difficulty in other authority areas where significant information is required up front when there is no detailed layout to work from. Essentially, even for detailed planning application the suggested

approach requires detailed working drawings which are not available at planning stage, and producing them at planning stage, when permission is not certain, adds a significant abortive cost to projects and increased risk. This is further exacerbated at outline stage where detailed drawings are a very long way off.

4.8 Finally, we have also experienced issues in BATHNES where the policy requirements mean that you either need to provide a model for energy use before the final design is agreed (as part of validation), which results in significant and usually abortive costs for developers because that model will be theoretical and not applicable to the final design of a scheme, which is often refined during working drawings stage; and we have experienced final certificates to demonstrate compliance have been requested prior to the building being built, which isn't possible to provide.

4.9 In light of these concerns, we consider that the practicality of the policy needs much more consideration, because it will not only lead to abortive work for applicants but also significantly add to the amount of time required by Council officers to assess applications against this policy – when existing resources are already thinly stretched. In our view, policies such as these are inappropriate and it is best left to national policy and buildings regulations to determine a more consistent and viable approach.

Affordable Housing

4.10 We support the proposed target of 35% of affordable housing given this has been previous planning policy requirements in SGC and appears to have been relatively successful, without rendering the majority of developments unviable. We also have no objection to 40% on-site affordable housing however would urge the Council to consider now in more detail how they intend to implement the part of the policy which references *'no significant infrastructure requirements'* – will this require viability assessments to be prepared for greenfield sites that cannot commit to 40% and could this lead to a further slow down in securing planning permission for these sites and delivering homes – this needs to be clarified.

4.11 We also note that there appears to be no reference to First Homes within the emerging policy – whilst we have no objection to this given the current issues with the Government's First Homes policy which means less social / affordable rent housing is delivered, we question whether this is compliant with national policy – if it is not, it could render the emerging plan unsound on this basis.

Strategic and Major Site Delivery Policy

4.12 We broadly support the wording of this policy however we would make some comments in respect of this:

Emerging Policy Requirement	Our Comments
Agree a clear vision, programme management plan and governance structure.	We have no concerns over this but the supporting text refers to this being agreed prior to outline approval. In our view this should be prior to submission of an application and agreed during pre-application stage ideally.
Plan the allocation in a comprehensive manner, working joint with relevant landowners and developers including registered providers and self and custom build enablers, to ensure land value and infrastructure costs are shared fairly and proportionately.	We have no overall objection to this but it has to be accepted by SGC that some landowners will not be willing to engage with one another. In our view, weight should be given to land within single control or with a minimum number of landowners.
Agree the composition, administer, and promote liaison via a stakeholder engagement group that will meet regularly through the design and construction phases.	We have no objection to this.
Develop a communication strategy setting out benefits of the scheme, including a wider community engagement strategy from concept to final delivery.	We have no objection to this given that we agree that the benefits of a new development are not often widely shared to the local community.
Undertake pre-app engagement and Design Review of the emerging masterplan and Affordable Housing masterplan, initial development parcels, key parts and aspects of the scheme, including Design Code testing prior to 1st R/Ms approval.	We have no objection to this, albeit we do not consider that Design Review should be required for Design Codes and RM layouts as the outline application process should set a clear framework for how any development should proceed to these stages.
Provide an Affordable and Self and Custom Housing masterplan(s) and delivery schedule(s) to ensure that they are delivered in step with the market	This would be difficult to provide at the outline masterplan stage given the scale of the strategic allocations suggested and would seem impractical. Our recent experience of such plans agreed at outline stage is that they quickly

housing over the course of the development	become unworkable and then there is a tension between them and the more detailed proposal for a site, with a variation of the original plan or condition being required which leads to delay and uncertainty. We would suggest this is re-worded to make clear that it would form part of the RM application stage.
Depending upon the vision and particular objectives of the scheme utilise a nationally recognised accreditation standard(s) for example, BREEAM Communities and Building with Nature.	We have no overall objection to this but it must be borne in mind the viability of a project my influence the ability to meet such targets and that should be made clear.
Set out, consult on and agree long-term community development and stewardship arrangements in partnership with the council and relevant stakeholders including registered providers.	Whilst in principle we have no objection to this we would also ask whether consideration could be given to Councils managing public open space. This would have clear benefits for both existing and new residents.
Provide topographical and earthmoving information at outline application stage to demonstrate strategic green infrastructure, drainage and public open space requirements function and fit as part of the master planning process.	We have no objection to providing topographical information, however providing detailed earthmoving information at the outline application stage would be very difficult; for example, it is only when detailed drainage designs for RM applications are carried out that developers get a clear direction on the exact earthworks required. Therefore whilst some indication can be given at outline stage this wouldn't be fully agreed.
Provide ecological and landscape and play benefits early in the construction phase.	We have no objection in principle to this but it needs to be borne in mind the cost of providing such provision and developer cash flows when building out and selling sites. In some instances it will not be practical to provide the ecological and landscape elements of a development early on in the construction process.
Work with partner organisations to realise necessary supporting infrastructure in a timely way in step with housing delivery and additional	We have no objections to this.

infrastructure and Affordable Housing funding throughout the lifetime of the construction phase.	
Include review mechanisms to ensure sustainable construction, climate mitigation and adaptation objectives keep pace with new regulations, technology, national and local policy objectives.	We have no objections to this.
Provide opportunities for SME housebuilders, custom and self-builders.	We have no objections to this.
Provide a community, retail and employment strategy that integrates opportunities and floorspace across the scheme for a range of uses, types and scale of businesses including marginal activities such as start-ups, SMEs and charities, in the short (during the construction phase) and long-term.	We have no objections to this.
Agree and implement a construction and post construction monitoring and reporting regime to ensure compliance with required standards and feedback of resident's satisfaction.	We have no objections to this.

Stewardship Arrangements

4.13 While the policy objective of ensuring that detailed development proposals make clear what mechanisms will ensure that the public spaces and facilities that they deliver will be well managed in perpetuity it is extremely difficult at the outline application stage to create a management and maintenance strategy that details future ownership, a maintenance body and financial maintenance plan given that the final developer(s) for many of these sites will be unknown. Again, we would suggest that a public body, such as the Council or local Parish Council, should be considering taking on the public open space arrangements if such stewardship is going to be achieved – subject to financial contributions towards future maintenance.

5.0 WOODLANDS GARDEN COMMUNITY

5.1 As we have set out in previous representations, we propose Woodlands Garden Community as a suitable and sustainable option for growth in South Gloucestershire. This is due to its proximity to the Bristol urban edge, employment areas and transport links which means that the infrastructure required to support it is less than it would be for allocations in the periphery of the administrative area.

5.2 For completeness, we have provided a summary below of the evolution of the scheme to date and the supporting work that has already been carried out. In addition, we have reviewed the evidence base and comments associated with Woodlands GC prepared by SGC and have set out our response below.

The Site

5.3 South West Strategic Developments (SWSD) have a commercial agreement in place with the landowners of Woodlands Golf and Country Club. The land is identified on the Site Location Plan submitted as part of the 'Call for Sites' and amounts to a total of 108 hectares of land.

5.4 The site comprises two 18-hole golf courses on the site which are currently used as a Pay & Play Facility. The land is therefore relatively flat with areas of engineered landscaping to create bunkers, ponds, fairways and greens. On the southern and western boundaries of the site there is an engineered bund which is planted on top with trees and hedgerows, which provides significant screening in terms of landscape and noise. Along the other boundaries of the site there are trees and hedgerows as well as a series of small streams and ditches.

5.5 To the west beyond the M5 is the settlement of Almondsbury; to the south beyond the M4 is the urban edge of Bristol with Woodlands Business Park in close proximity as well as the local centres in Bradley Stoke; and to the north and east is agricultural land as well as West Country Water Park.

The Proposed Development

5.6 The proposals have evolved from the technical work undertaken over a number of years for the site. The current masterplan shows the following:

- Around 1800 homes
- Primary School
- Local Centre (to include a mix of small-scale office space, local convenience store, nursery and restaurant/pub)

- Care Home / Village
- Land for a GP Surgery/Dentist
- Significant Green Infrastructure – including Village Green, playing pitches, open parkland, riverside corridor walks, footpaths, etc.

Technical Work

5.7 As part of previous representations, we have submitted the following evidence base which underpins the Woodlands Garden Community scheme:

- Emerging Masterplan & Vision Document
- Transport Study
- Flood Risk & Drainage Note
- Landscape Summary Note, Strategic Landscape & Visual Assessment and Landscape Sensitivity & Capacity Study
- Green Belt Review
- Ecology Appraisal
- Noise Report
- Air Quality Report

5.8 Should the Council not have any access to these documents as part of the Call for Sites evidence base, please do let us know and we can make them available.

Progress to Date

5.9 On behalf of SWSD we have been promoting this site for development since 2016. This has included representations to various stages of the Joint Spatial Plan and Local Plans Process, as well as the Spatial Development Strategy. In addition to this we have twice tried to submit a pre-application to the Council but these have both been withdrawn due to a lack of Council resourcing.

5.10 In Autumn 2023 we undertook a web-based public consultation for the proposals. This included a website which set out the background to the site, the development proposals and the technical work so far.

5.11 The consultation elicited 101 responses from members of the public. Objectors to the scheme cited some concerns, primarily over transport, infrastructure and impact on the Green Belt. Some comments of support were also received that outlined the need to deliver more housing to meet demand and address affordability issues.

5.12 Grass Roots Planning Ltd also recently met with local MP Jack Lopresti who expressed his support for the proposals.

5.13 It is anticipated that the next stages would be to further refine the technical work and update this where required, and undertake Design Review Panel assessment which is scheduled for mid-February. Further consultation with the public may also be undertaken.

SGC Evidence Base

Sustainability Appraisal

5.14 We have reviewed the 'Sustainability Appraisal Report' prepared by LUC (December 2023) and have a number of comments on the assessment of Woodlands GC (Ref: SG114) (please note this relates to our land interests only and not to the two land parcels to the north of this site). For ease of reference, we have replicated the findings in the Sustainability Appraisal (SA) below:

1a	1b	2a	2b	2c	2d	3a	3b	3c	3d	3e	3f	3g	4a	4b	5a	5b	5c	5d	5e	5f	5g	5h	5i	5j	6a	6b
?	?	?--	--	0	+	++	++	+	++	-	+	0	0	+	--	--	--	?--	-	++	?--	0	0	0	?+	0

5.15 Our comments are as follows:

- Objective 2a: The site is not Publicly accessible Open Space, but a paid-for recreational space. Furthermore, it is located within 720m of a Public Right of Way. As such, it is our view that the site should score a 'minor positive effect' instead.
- Objective 4a: Given the close proximity of existing employment areas, Woodlands GC would not seek to detract from these key enterprise areas but instead provide new residents in close proximity. However, the development would be large enough to provide a primary school, local centre and some small employment. Therefore, we consider the site should score a 'minor positive effect' instead.
- Objective 5a: There are no listed buildings on site, however, there are a number of Grade II and II* listed buildings to the north east, circa 500m away from the edge of the site. Given the lack of intervisibility between the site and these assets, it is considered that the site should score a 'negligible effect' – see our additional heritage assessment work submitted in support of these representations.
- Objective 5b: Having reviewed the 'Know your Place' website, we cannot find any examples of non-designated heritage assets nearby that would be affected by the proposals. Therefore, we consider that the site should score a 'negligible effect'.
- Objective 5d: The Ancient Woodland designation referred to appears to be incorrect, as there have been no blocks of ancient woodland in this location since at least 2005. We suggest the site should score a 'minor negative' effect instead.

- Objective 5g: Given the historic land use on this site, and the associated earthworks, we consider that any previous Agricultural Land Value would now be lost on this site. As such, the site should score either a 'minor negative' effect or even possibly a 'negligible' effect.

5.16 Accordingly, we consider the SA for Woodlands GC should be revised to the following:

1a	1b	2a	2b	2c	2d	3a	3b	3c	3d	3e	3f	3g	4a	4b	5a	5b	5c	5d	5e	5f	5g	5h	5i	5j	6a	6b
?	?	+	--	0	+	++	++	+	++	-	+	0	+	+	0	0	--	-	-	++	-	0	0	0	?+	0

5.17 We would urge SGC to 'sense check' this data for the policy and site options presented in the SA given this was a critical issue during the JSP plans process.

Comments on the Site

5.18 As SGC will be aware, there is an extensive level of technical work associated with WGC already which underpins the masterplan for development. We note a number of comments set out within the Local Plan regarding the site (paragraph 6b.27, page 104 of the consultation document) and have looked to respond to this as part of these representations with additional technical work where possible given the timeframes.

L2-FC2 (Woodlands Golf Course) would require strategic scale interventions to provide safe access onto the strategic and local road network, including a significant crossing of the M4 for people, public transport and cars, and it is currently unclear from the information provided how this will be achieved and funded in the plan period.

5.19 SLR's report which accompanies these representations (Appendix 1) set out in more detail the interventions required to provide safe access onto the strategic and local road network. To clarify, the crossing over the M4 would be for an 'Active Travel' connection (foot and cycle bridge) only which would be 5.0m wide. The existing bridge for cars could therefore be widened to 6.5m to allow buses to pass one another.

5.20 The original costs for this footbridge were estimated to be circa £5-6.5m – accounting for inflation, we estimate that this would now cost circa £6.2-8m. Discussions are due to take place imminently with National Highways to agree the detailed costs.

A solution will be required for enhanced capacity at M5 motorway junctions 16 and 17 if all sites in this area were progressed as part of the preferred strategy.

5.21 The transport and highways work that has been undertaken as part of this site acknowledge the potential impact on J16 of the M5 motorway in the PM peak period and several solutions

have already been considered to resolve this, which will be discussed with National Highways in due course.

5.22 However, the latest report from SLR indicates that the 2018 modelling previously prepared is likely to have overestimated network traffic flows and is likely to operate better than what was expected.

5.23 As part of previous representations SLR have prepared a junction improvement scheme which includes the provision of a left-hand turn bypass lane to allow the free-flow of traffic onto the slip road towards the M5; and the provision of a fourth lane when exiting Aztec West onto Gloucester Road.

5.24 An updated assessment methodology is currently being agreed with SGC highways in order to understand the impact that the site will have on Junction 16 and how the improvements will help mitigate this.

It is likely a solution will be required for the entrance to L2-FC2 Woodlands due to targeted higher flood zones at Trench Lane and Hortham Lane.

5.25 A technical addendum note from SLR Consulting has been prepared which discusses the above issue. This confirms the following:

- The access at Trench Lane lies within Flood Zone 1 – a localised area of surface water flooding is evident on site to the north of where the access joins Trench Lane.
- The access to the north at Hortham Lane crosses an area of Flood Zone 3. Hortham Lane is elevated above the floodplain and the access will therefore be raised to join this position. Raising land can in turn displace floodwater, therefore the access road proposals will be subjected to hydraulic modelling, with compensation identified to mitigate this risk if required – there is extensive land in this part of the site available to achieve this if required.
- Surface water runoff will be managed using Sustainable Drainage Systems (SuDs) which may resolve localised areas of surface water flooding. However, a small culvert may be required beneath the access road to allow runoff to drain beneath it and into Hortham Brook.

5.26 As such, it can be concluded that during extreme flood conditions, both accesses will be available from Trench Lane and Hortham Lane.

L2-FC2 (Woodlands Golf Course has been identified as having a large area of onsite contamination due to past land uses and this is likely to incur further costs on development raising questions as to whether the site would provide all necessary supporting infrastructure, such as transport, primary school and local centre provision and maximise affordable housing provision.

5.27 It is common knowledge that the site has been subject to extensive earthworks and remodelling and originally formed part of a legal case brought by the EA against Churngold, however did not end up in the final litigation proceedings due to no significant contaminants being found on the site after detailed EA testing and investigation had taken place.

5.28 It is also acknowledged that the bund to the west of the site may be contain some contaminative material, however the masterplan does not seek to develop any of this area and the bunds will be retained, and if required, capped off.

The combination of challenges highlighted above mean further evidence would likely be required to understand the site's viability and ability to deliver homes over the plan period.

5.29 The current masterplan for the site is underpinned by significant technical work and identifies a development of around 1800 homes, a local centre, primary school, and significant green infrastructure. It is possible through further technical work this number may be increased – for example, new eDNA testing will be undertaken on the ponds on site to see whether Great Crested Newts are still present on the site. If not, this may allow the developable area to be increased to the north of the site and additional homes to be provided.

5.30 We note that the two sites to the north of Woodlands GC which are also recommended for allocation to deliver 280 units. At this stage we do not consider that these two sites are deliverable given that a new Green Belt boundary on this northern edge needs to be delivered and without the WGC site they would be inaccessible to local services, facilities and employment opportunities.

5.31 In terms of deliverability, work from the outset has sought to ensure that there can be delivery of homes within the first half of the plan period. This has included costing the infrastructure (such as the M4 bridge) and seeking discussions with utilities providers to understand the constraints on site.

Comments on the Proposed Allocation

5.32 Page 397 – 400 of the Local Plan document sets out a detailed table of the expected requirements for the development of Woodlands Golf Course. We provide detailed

comments below to assure the Council that progress has been made, or will be made towards various objectives.

It is expected that development would take account of policies drafted in the South Gloucestershire Local Plan as a whole.

5.33 The proposals would take account of policies drafted in the South Gloucestershire Local Plan, when finalised – we have set out where some elements may be difficult to pursue.

Subject to resolving strategic transport issues, development should ensure that appropriate opportunities to promote sustainable transport are taken up, including limiting the need to travel and maximising opportunities for walking, cycling, wheeling and effective access to public transport.

5.34 As the Council are aware, work to this effect has already been undertaken to resolve the strategic transport issues; contact will be made with National Highways imminently to discuss the proposed options for this. In addition, priority is being given to promoting sustainable transport options and the accompanying technical note from SLR Consulting sets out how this is being achieved:

- Discussions have been initiated with First Bus to understand whether it is possible to divert the T1 or 73 bus route – initial conversations have indicated that the provision of an additional bus for the T1 to divert through the site would be preferable.
- Discussions have been initiated with SUSTRANS for updates to their work which set out originally how the local walking and cycling network could be upgraded, particularly Concorde way.
- A review has been initiated to understand whether Active Travel links to Aztec West, Parkway Rail Station and Bristol City Centre can be improved.
- Consideration has been given to the layout, with a focus on promoting active travel first and creating a 15-minute neighbourhood – this includes provision of services and facilities on site, as well as the inclusion of a mobility hub for car club hire, e-scooter and e-bike hire and bus provision.

5.35 Accordingly, the evidence to date shows our commitment to ensuring that sustainable transport options are maximised and the site offers an enviable location that can harness existing public transport infrastructure and the facilities and employment opportunities in the northern fringe of Bristol. Other sites previously considered for allocation in more peripheral locations within SGC but to the north of the Green Belt did not offer such a location.

Development should protect and enhance the footpath through the site, including the Public Right of Way (OAY/35).

5.36 We have no overall objection to this particularly as footpath OAY/35 provides a north-south route through the site which will provide an Active Travel connection for residents. Some of the other existing footpaths will be crossed by new infrastructure (for example OAY/34) – however, crossing points will give priority to pedestrians and cyclists and in turn new routes will be provided through the development to provide a pleasant experience for walkers and cyclists.

Development should take account of the area adjacent to Hortham Brook that is known to be subject to Flood Zone 2 and 3, be supported by a site-specific flood risk assessment and apply a sequential layout to development on site, to direct development away from areas of highest existing or future flood risk.

5.37 Any future application will be supported by a site-specific flood risk assessment and as the current masterplan shows, sensitive development will avoid development near to Hortham Brook.

Development of homes within Flood Risk Zone 3a will be considered incompatible.

5.38 We can confirm that no dwellings will be proposed within Flood Zone 3a.

As Hortham Brook is a Main River, development should take account of the need to ensure adequate access to the river. This amounts to 8m for non-tidal main rivers and 16m for tidal main rivers.

5.39 The current masterplan shows limited development adjacent to Hortham Brook, with this area of the site proposed to be dedicated for strategic green infrastructure and a riverside park. Therefore, these easements can and have been allowed for.

The site is known to be at risk of surface water flooding across the site. Development should incorporate sustainable drainage system (SuDs), as set out within the SuDS Supplementary Planning Document (SPD), which deliver multifunctional benefits, unless there is clear evidence that this would be inappropriate.

5.40 A note has been prepared by SLR Consulting (Appendix 2) which supports these representations. This discusses the limited nature of surface water flooding across the site and how SuDs will be incorporated within the development. This note is intended to

supplement the original work already undertaken previously to underpin the site's development.

The south and east of the site falls within the Woodland Strategic Network and Indicative Wetland Opportunities. Development should identify opportunities to reduce the causes and impacts of flooding, including maximising opportunities for natural flood management and multi-functional green infrastructure.

5.41 We are unclear where this designation is derived from however the current masterplan shows a series of SuDs along the eastern edge of the site alongside the existing pond infrastructure – this provides opportunities for wetlands to be created. New planting will be proposed within areas of strategic landscaping infrastructure to provide additional tree coverage.

The site has a limited potential to include heritage assets with archaeological interest, and therefore a desk-based assessment will be required and, where necessary, a field evaluation.

5.42 Given the history of earthworks on this site, it is possible that any archaeological remains have already been disturbed. However, we can confirm that in due course, an archaeological desk-based assessment, and if required, field evaluation, will be undertaken.

5.43 A note prepared by Pegasus (Appendix 3) has been completed and can be found in conjunction with this report. This has concluded the following in respect of heritage:

- The only built heritage assets that have been identified as sensitive to the development are the group of assets at Manor Farm, Court Farm Farmhouse and Green Farm Farmhouse;
- With a sensitive design approach, as already set out within the masterplan, the development would result in less than substantial harm at the lower end of the spectrum to Manor Farm, and no harm to Court Farm, Green Farm and the listed walls and non-designed local park and garden at Manor Farm.

5.44 This supports our conclusions set out within our comments on the Sustainability Appraisal within these representations in that the site can be developed sensitively with limited harm to heritage assets in the locality.

The site is located within the Green Belt.

5.45 The evidence currently prepared by Liz Lake Associates notes that the site is very well contained given the existing green infrastructure surrounding the site including the provision of bunds which wrap around the western and southern edges of the land.

5.46 In light of the emerging allocation, it is assumed that the site would be permanently removed from the Green Belt designation and so would not be tested against these particular policy requirements.

There is an area of Ancient Woodland located to the south of the site. Development must not result in loss or deterioration of these irreplaceable habitats.

5.47 Having reviewed the planning policy maps, and historic aerial images of the site, it appears that the Ancient Woodland designation does not correlate with what was (previously) on the land. A series of trees were removed some 20+ years ago as part of the tipping works undertaken on the site however these did not form part of any ancient woodland.

5.48 As such, opportunities will instead be taken to provide new blocks of woodland planting as part of the strategic landscape infrastructure.

The site contains trees which are protected by Tree Protection Orders. Development should recognise the wider benefits from natural capital and ecosystem services - including of trees and woodland.

5.49 Trees protected by Tree Preservation Orders will be retained and protected appropriately, unless they have been identified as unsafe and require removal.

There are known areas of contamination across the site, particularly but not limited to the western boundary of the site adjacent to the M4 / M5. Development should be informed by a Land Contamination and Land Stability Risk Assessment, seeking to make recommendations for remediating and mitigating despoiled, degraded, contaminated and / or unstable land where this is appropriate to do so.

5.50 Any planning application will be supported by a Land Contamination and Land Stability Risk Assessment. However, the proposed bund to the west of the site will be retained and no development is proposed within these areas.

5.51 With respect to the remainder of the site, the land originally formed part of the original case against Churngold Construction and as such, contamination testing was undertaken by the Environment Agency. The results of this showed limited contaminative material and was not taken forward by the EA as part of their prosecution of Churngold.

Development should take account of the overhead powerline which crosses the central area of the site from east to west.

5.52 Discussions have been initiated with National Grid to understand the cost and time implications of either diverting or burying the overhead powerlines on site. Currently we do not consider that this renders the scheme undeliverable, but should this prove to be unfeasible, the masterplan will be updated to accommodate the appropriate easements.

Development should be comprehensively masterplanned with adjacent sites, including EPS-SV5 and EPS-SV7.

5.53 Discussions have previously taken place with the adjacent landowners so that a comprehensive masterplan could be achieved. However, unrealistic expectations of land values has made any agreement between parties impossible.

5.54 Given the expectation to create a new defensible Green Belt buffer in this location, it is our position that this would be delivered on the WGC site and these additional sites would potentially erode that objective – alternatively the sites could be considered to deliver Gypsy & Traveller pitches.

6.0 SPECIFIC ANSWERS TO QUESTIONS RAISED

Questions: The Infrastructure Position Statement (IPS) sets out for information what is currently planned and how planning for each type of infrastructure is currently undertaken. Moving forward we would welcome views, particularly from developers and infrastructure providers on how infrastructure could be brought forward in a more timely way during the development process.

Question: We have to understand development economics in order to ensure infrastructure, where needed, is affordable and deliverable. We therefore would welcome feedback, particularly from developers and land agents on the proposed issues, methodology and inputs in undertaking a full Viability Assessment, as set out in the Viability Position Statement (VPS). Send us your feedback by completing the questionnaire on our consultation page.

5.1 SWSD look forward to receiving invites to Stakeholder Engagement sessions once scheduled, so that they can provide input regarding revenue, cost and other assumptions involving the Viability Assessment.

Question: Do you have any comments on our emerging preferred strategy?

5.2 We agree with the emerging preferred strategy as set out in the current Local Plan, for the reasons we have set out in our representations.

Question: Do you have any comments on the 'No Green Belt Loss' strategy lens?

5.3 Yes, we do not consider this to be an appropriate spatial strategy to pursue in light of the Sustainability Appraisal evidence that shows this alternative strategy performs badly against many of the SA criteria and is sub-optimal when compared to then alternatives. The map which accompanies this lens also clearly shows how development avoiding the Green Belt would result in 'leap-frogging' to locations that are divorced from the main population centres of SGC. Providing development in such peripheral locations, where public transport links are generally poor, will lead to increased use of the private car and will not address the housing needs that are focused on Bristol.

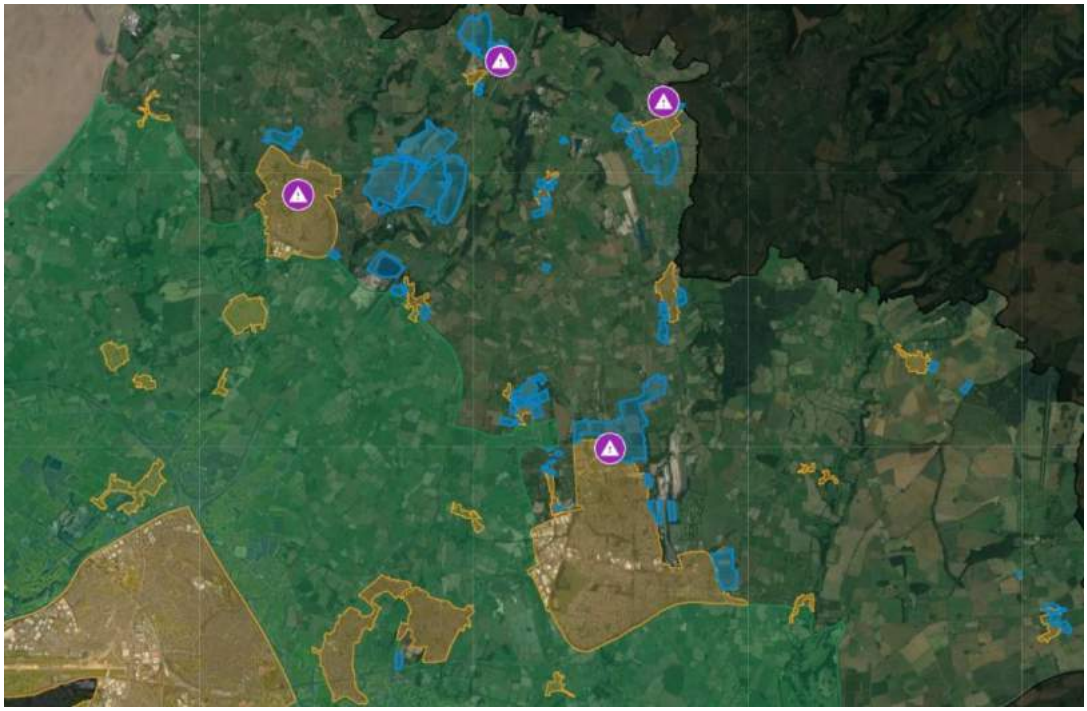


Figure 1. Extract of the 'No Green Belt Loss' lens

5.4 Evidence we previously presented as part of the JSP showed how avoiding the Green Belt would result in significantly increased CO_2 emissions arising from larger number of residents travelling further to Bristol for work. It is far better to release Green Belt land in a sustainable location, than to protect this at the expense of development in an unsustainable location, which defeats climate objectives. We therefore do not consider it to be appropriate to avoid Green Belt land, as this would lead to an unsustainable plan strategy.

Question: Do you have any comments on the 'Urban Edge' strategy lens?

5.5 Yes, as set out we support the 'Urban Edge' strategy lens strategy given its ability to harness and leverage existing infrastructure, for example bus provision, existing schools, etc.

Question: Do you have any comments on the 'Transport Corridors and Hubs' strategy lens?

5.6 We support the provision of development in proximity to places which are, or can be made, sustainable – these are often locations focused on transport corridors that are well provided by public transport. However, the map of this lens shows that there would be considerable development along certain routes which actually provides little connection to existing settlements, services and facilities. Whilst these sites are on bus routes it would require significant additional infrastructure to make these viable, compared to locating development on the urban edge of Bristol, this will be costly to deliver.

7.0 CONCLUSIONS

7.1 We are pleased to see that South Gloucestershire Council is not 'shying away' from the standard method figure but consideration ought to be given to a higher housing requirement in respect to accommodating Bristol's unmet need, affordable housing need, inward migration and student numbers. In turn this may mean that further allocations are required to support the plan.

7.2 Broadly we agree with the spatial strategy set out, in that it promotes the sustainable strategic release of Green Belt land on the urban edge of Bristol, where demand is greatest and existing infrastructure can be enhanced and extended. Supporting this we agree that smaller settlements have a role to play in providing some level of growth to sustain them.

7.3 The Sustainability Appraisal work requires a 'sense check' of certain sites, including land at Woodlands Golf Course, to ensure that the work is correct, or justification needs to be given by LUC as to why those particular scores have been retained.

7.4 However, we are pleased to see this site allocated as we agree that it is a suitable option for development given its location on the urban edge of Bristol.

7.5 We look forward to discussing WGC further with officers in due course as part of our planning application and seeing the next iteration of the plan with this site allocated for a mixed-use development within it.

Appendix 1 – Transport Report

Woodlands Garden Community

Regulation 18 Transport Submission

SWSD

Prepared by:

SLR Consulting Limited

3rd Floor, Brew House, Jacob Street, Tower Hill,
Bristol, BS2 0EQ

SLR Project No.: 416.065105/00001

15 February 2024

Revision: V03

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
V2	13 February 2024	TD	DR	DR
V3	15 February 2024	TD	DR	DR
	Click to enter a date.			
	Click to enter a date.			
	Click to enter a date.			

Basis of Report

This document has been prepared by SLR Consulting Limited (SLR) with reasonable skill, care and diligence, and taking account of the timescales and resources devoted to it by agreement with SWSD (the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

SLR shall not be liable for the use of or reliance on any information, advice, recommendations, and opinions in this document for any purpose by any person other than the Client. Reliance may be granted to a third party only in the event that SLR and the third party have executed a reliance agreement or collateral warranty.

Information reported herein may be based on the interpretation of public domain data collected by SLR, and/or information supplied by the Client and/or its other advisors and associates. These data have been accepted in good faith as being accurate and valid.

The copyright and intellectual property in all drawings, reports, specifications, bills of quantities, calculations and other information set out in this report remain vested in SLR unless the terms of appointment state otherwise.

This document may contain information of a specialised and/or highly technical nature and the Client is advised to seek clarification on any elements which may be unclear to it.

Information, advice, recommendations, and opinions in this document should only be relied upon in the context of the whole document and any documents referenced explicitly herein and should then only be used within the context of the appointment.

Table of Contents

1.0 Introduction 1
2.0 Local Plan 5
3.0 Existing Conditions 10
4.0 Changing Mobility Habits 31
5.0 Vision and Validate Approach 42
6.0 Access Strategy 55
7.0 Trip Generation and Assessment 59
8.0 Local Plan Stage 1 Modelling Outputs Reports 63
9.0 Summary 72

Tables in Text

Table 2.1: Preferred sites 5
Table 2.2: Lens 2 Sites 6
Table 3.1: Trench Lane traffic flows 13
Table 3.2: Hortham Lane traffic flows 14
Table 3.3: Local Facility Table 17
Table 3.4: Local Bus Service Summary 20
Table 3.5: Rail Summary Table 22
Table 4.1: Traffic Data A38 Aztec West 32
Table 4.2: Traffic Survey Data Comparison (2016 and 2024) 33
Table 4.3: SRN Traffic Flow Trends 34
Table 8.1: Lens 2 Impacts 65

Figures in Text

Figure 1.1: Woodlands Garden Community and Local Plan Context 2
Figure 2.1: Lens 2 Sites 7
Figure 2.2: Lens 2 Development Assumptions 8
Figure 3.1: Approximate Site Location Plan 11
Figure 3.2: Existing Trench Lane Access 12
Figure 3.3: Local Facilities Plan 15
Figure 3.4: Walking Isochrone Plan 15
Figure 3.5: Cycling Isochrone Plan 16
Figure 3.6 - TIER Area of Operation and Parking Locations 23

Figure 3.7 - Voi Bristol & South Gloucestershire Mode Shift Survey 24
Figure 3.8: Desire Line and existing Cycle Route to Aztec West 25
Figure 3.9: Existing Route to Bristol Parkway Railway Station 26
Figure 3.10 – Existing Route to Woodlands Business Centre 27
Figure 3.11: Existing Route to Cribbs Causeway 28
Figure 4.1: North of M4 Junction 20 (AM Peak Hour 0800 to 0900) 35
Figure 4.2: North of M4 Junction 20 (PM Peak Hour 1700 to 1800) 35
Figure 4.3: Commute Wellbeing 37
Figure 4.4: Internet Access By Age Group 38
Figure 4.5: South Gloucestershire EV Charging Points Installed 40
Figure 5.1: Access Hierarchy 43
Figure 5.2: SGC Transport Hierarchy 44
Figure 5.3: Local Living (15 Minute Neighbourhood Approach) 47
Figure 5.4: Primary Mobility Hub Illustration 49
Figure 5.5: Active Travel Strategy 51
Figure 5.6: Existing Bus Route (T1) 52
Figure 5.7: Potential Bus Service Arrangement (T1 Altered Frequency & New Route) 53
Figure 6.1: Active Travel Strategy 57
Figure 6.2: SUSTRANS Proposed Improvement Strategy 58
Figure 7.1: 2018 VISSIM Model Network 60
Figure 8.1: Lens 2 Sites 64
Figure 8.2: Lens 2 Development Assumptions 64
Figure 8.3: Lens 2 Impact on Traffic Flows (AM) 66
Figure 8.4: Lens 2 Impact on Traffic Flows (PM) 67
Figure 8.5: AM Delay (Lens 2 v DM) 68
Figure 8.6: PM Delay (Lens 2 v DM) 69

Appendices

Appendix A Illustrative Masterplan

Appendix B Access Design Drawings

1.0 Introduction

1.1 Background

1.2 SLR Consulting Limited has been appointed by SWSD to provide Transport Planning advice with regards to the promotion of the Woodlands Garden Community site through the South Gloucestershire Council (SGC) new Local Plan (2040). An illustrative masterplan is provided at **Appendix A.**

1.3 The site (allocation Code: EPS-FC14) is identified within the *New Local Plan Phase 3 Towards a preferred strategy (Consultation document 2023)* for a residential development including a primary school and local centre. The Emerging Preferred Strategy suggests that the site could deliver 800 homes in the plan period and a further 950 dwellings beyond the plan period, bringing the total to 1,750 homes. Two adjacent sites (EPS-SV5 and EPS-SV7) to Woodlands Garden Community are also included in the Emerging Preferred Strategy but these will deliver up to 280 homes beyond the plan period.

1.4 For clarity this document promotes site EPS-FC14 only (1,750 dwellings total).

1.5 As part of the analysis work included within the *New Local Plan Phase 3 Towards a preferred strategy (Consultation document 2023), '*3 Lenses' are considered (L1: Local Plan with no Green Belt Loss, L2: Local Plan Urban Edge, L3: Majority of new homes provided along already established key public transport routes and hubs).

1.6 The Woodlands Garden Community site is included as part of the Lens 2 assessment, and the development assumption is different to that identified in the Emerging Preferred Strategy.

1.7 As set out within the *New Local Plan Phase 3 Towards a preferred strategy (Consultation document 2023)*, the Woodlands Garden Community site is allocated for delivery of 800 dwellings during Plan period and 950 houses beyond the plan period. In respect of the two adjacent sites, these are not anticipated to deliver any housing during the plan period.

1.8 The Lens 2 assessment shows the Woodlands Garden Community site (Site L2-FC2) delivering 875 homes in the plan period and 880 homes beyond the plan period, with the two adjoining sites (Site L2-SV2 and L2-SV3) delivering 295 dwellings in the plan period. The location of sites LS-FC2, L2-SV2 and L2-SV3 are shown in **Figure 1.1** for context.

1.9 As the Preferred Strategy does not identify the two adjacent sites for delivery in the plan period, we are of the view that the Lens 2 assessment of a total of 1,170 dwellings (at Woodlands Garden Community and the two adjacent sites) should and can be delivered at Woodlands Garden Community in the plan period.

Figure 1.1: Woodlands Garden Community and Local Plan Context



1.10 The focus of this report is therefore linked to the Lens 2 assessment and the associated strategy.

1.11 Phase 3 of the local plan states that:

> *When making choices about where homes and jobs should be located, the emerging preferred strategy has, where possible, been influenced by the following principles:*
>
> - *Locate homes and jobs in places that reduce the likelihood of long travel commutes.*
> - *Locate homes and jobs in places where active travel connections already exist, can readily be enhanced, or new connections can be delivered and provide an attractive alternative to private car travel.*

- *Locate homes and jobs in locations that are on existing public transport routes or could be capable of delivering high-quality, viable and reliable public transport services in future.*
- *Locate homes and jobs in places that avoid, where possible, a high reliance on private car-based travel or costly infrastructure packages that are unlikely to be delivered in the plan period.*

1.12 This report takes into account the above requirements.

Context – 2018 Transport Study

1.13 This Transport Report should be read in conjunction with the Transport Study dated January 2018 that was prepared for the promotion of the site as part of the now withdrawn Joint Spatial Plan (JSP).

1.14 The 2018 study considered the transport impact of a development comprising 2,000 dwellings, a 2 Form Entry Primary School, Retail Provision and Local Centre and Care Home.

1.15 The access strategy comprised a vehicle access onto Trench Lane (primary access) and Hortham Lane. The access proposal for Trench Lane remains the same. The Hortham Lane access has been amended to a priority-controlled T-junction and shifted to the west.

1.16 A new active travel link via a new bridge over the M4 parallel to the Trench Lane bridge will be delivered. This would provide a segregated and direct pedestrian and cycle link between the site and Woodlands Lane. This remains unchanged.

1.17 Details of the vehicle access designs, and active travel bridge is provided at **Appendix B**.

Scope

1.18 A meeting was held with SGC planning and highway team on 21 November 2023 to discuss the Local Plan. A separate transport meeting was held with SGC transport team on Tuesday 16 January 2024. This included the Transport Policy Officer, Highways Development Control, and the Travel Plan officer.

1.19 A meeting was held between First Bus and SLR on 26 January 2024. First Bus suggested that there is potential for the T1 service to be diverted through the site whilst also still serving its existing route. This is subject to further assessment with the details set out later in this report.

1.20 SGC Transport Team presented the work undertaken to date on the Local Plan in terms of modelling and transport impact. Whilst at this stage it is unclear the extent of additional mitigation that is needed, SWSD's objective is to work collaboratively with SGC to identify

the exact need for improvements and desired mitigation measures and how these could be addressed or contributed to by Woodlands Garden Community.

1.21 Network operational enhancements can be delivered in many different ways, in particular through reduction in the demand for travel at congested time. This can be delivered through the following measures which would form the basis of the transport strategy for Woodlands Garden Community which are discussed in **Chapter 5**:

- Trip Containment – provision of onsite facilities;
- Masterplanning for people and places and not cars; and
- Mode shift from car to sustainable modes.

1.22 The vision for the scheme would be to implement sustainable transport measures to encourage a higher proportion of trips by sustainable modes. Only after the benefits of these have been realised should there be any consideration of capacity enhancements.

2.0 Local Plan

New Local Plan Phase 3 Towards a preferred strategy (Consultation Document 2023)

2.1 Section 5 Appendix 1 of the New Local Plan Phase 3 report, sets out a schedule of preferred sites in the emerging preferred strategy. **Table 2.1** provides a summary of the Woodlands Garden Community allocation (EPS-FC14) as well as the two adjacent sites (EPS-SV5 and EPS-SV7).

2.2 SWSD interests lies with site EPS-FC14 only. This document is for the promotion of site EPS-FC14 only.

Table 2.1: Preferred sites

Allocation Site	Address	Place	Proposed Use	Capacity for Homes in the Plan Period	Capacity for homes beyond the plan period
EPS-FC14	Woodlands Golf Course, Trench Lane, Almondsbury, (Woodlands Garden Community)	Woodlands	Residential, facilities including primary school and local centre	800	950
EPS-SV5	Land on the South Side of Gaunts Earthcott Lane	Woodlands	Residential	0	180
EPS-SV7	Land off Gaunts Earthcott Lane	Woodlands		0	100

2.3 As set out within the *New Local Plan Phase 3 Towards a preferred strategy (Consultation document 2023)* and as summarised in **Table 2.1**, the Woodlands Garden Community site is allocated for delivery of 800 dwellings during Plan period and 950 houses beyond the plan period. In respect of the two adjacent sites, these are not anticipated to deliver any housing during the plan period.

2.4 **Table 2.2** provides a summary of the Lens 2 assessment which assumes a different development schedule and strategy for the Woodlands Garden Community site and the two adjacent sites. It is the Lens 2 site assumptions that has been used to inform the initial modelling[1] work undertaken by SGC for the Local Plan

[1] Local Plan Stage 1 Modelling Output Report (2024)

Table 2.2: Lens 2 Sites

Reference	Address	Capacity for Homes in the Plan Period	Capacity for homes beyond the plan period
L2-FC2 (EPS-FC14)	Residential, facilities including primary school and local centre	875	880
L2-SV3 (EPS-SV5)		108	
L2-SV2 (EPS-SV7)		187	
Combined		1170	880

2.5 The *New Local Plan Phase 3 Towards a preferred strategy (Consultation document 2023)* states that the Woodlands Garden Community site could deliver 800 homes during the plan period, whilst the Lens 2 assessment assumed 875 homes in the plan period.

2.6 In respect of the two sites off Gaunts Earthcott Lane (EPS-SV5 and APS-SV7), the *New Local Plan Phase 3 Towards a preferred strategy (Consultation document 2023)* states that no dwellings will be delivered during the local plan period. However, the Lens 2 assessment states that two sites off Gaunts Earthcott Lane (L2-SV2 and L2-SV3) could deliver 108 (L2-SV3) and 187 (L2-SV2) dwellings respectively during the local plan period.

2.7 Notwithstanding the above, the two sites off Gaunts Earthcott Lane (EPS-SV5 and APS-SV7) are reliant on the Woodlands Garden Community site (L2-FC2 (EPS-FC14) coming forward first in order for the sites off Gaunts Earthcott Lane to be considered to be accessible. In the event that the two sites off Gaunts Earthcott Lane (L2-SV2 and L2-SV3) were to be delivered in isolation then access (vehicle and sustainable access) would be directly from Horetham Lane. There is no footpath provision for around 1km between the two sites off Gaunts Earthcott Lane and the built-up area of Hortham. A less direct route would be also needed to access facilities at Aztec West, Cribbs Causeway, and local rail stations. The travel distance to Aztec West from the two sites off Gaunts Earthcott Lane (L2-SV2 and L2-SV3) would be at least 750m longer than if those trips were routed through Woodlands Garden Community and which would connect to Woodlands Lane via a new active travel bridge over the M4.

2.8 Separate planning submissions make clear there is a reasonable prospect of a higher level of development on the SGC site within the plan period than the 800 currently envisioned, given the absence of significant infrastructure constraints in the area. As such we are of the view that the 1,170 dwellings identified for delivery in the Lens 2 assessment should all be included within the Woodlands Garden Community site, with houses delivered on the two sites off Gaunts Earthcott Lane to be delivered beyond the plan period or this land to be retained for landscaping purposes only.

Stage 1 Modelling Outputs Report

2.9 The SGC Stage 1 Modelling Outputs Report was published in January 2024, and forms an evidence base for the New Local Plan. The report presents the inputs considered for the development lenses and the respective model outcomes. Thet report is based on the West

of England Regional Transport Model (WERTM) suite consisting of Highway Assignment Model (HAM), Public Transport Assignment Model (PTAM) and Variable Demand Model (VDM) components to develop forecast year model scenarios for 2042 with SGC's local plan development changes.

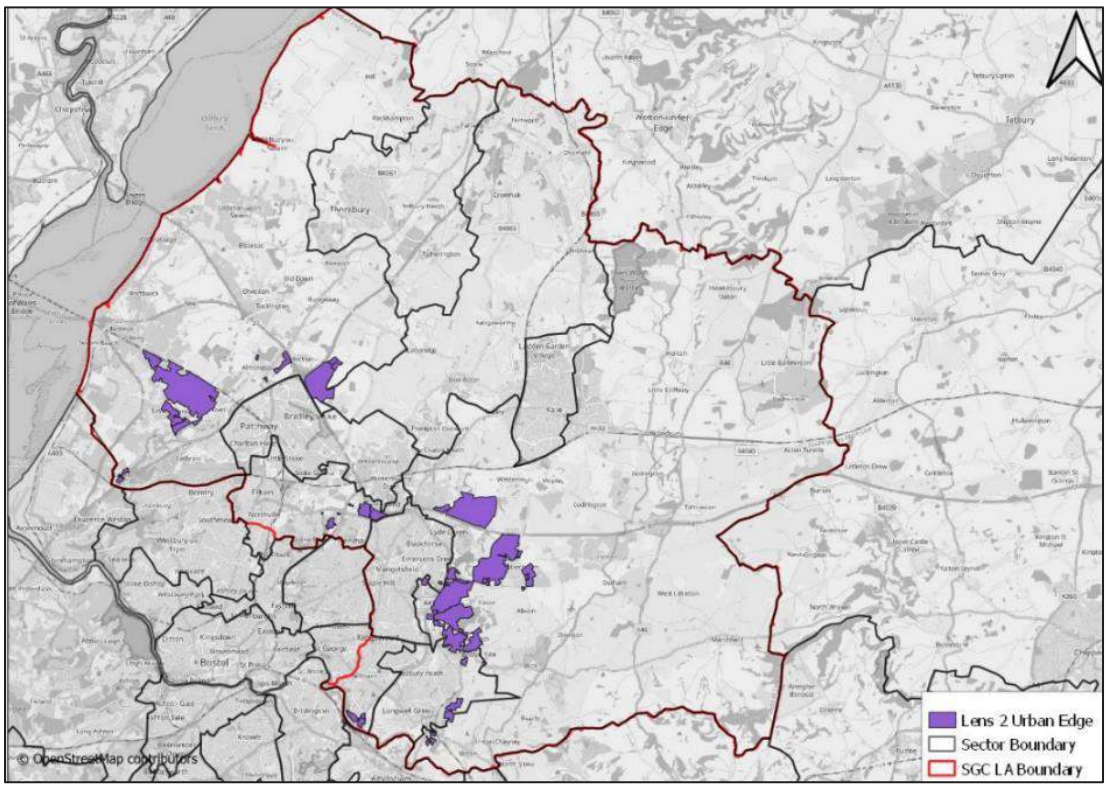
2.10 Three Do Something (DS) lenses have been tested at this stage and the impacts on the transport network, measured against the Do Minimum (DM) scenario. These are described below:

- **2042 Do Minimum**: this is the 2042 scenario with no Local Plan, but includes committed development and transport schemes which are assumed to have been completed by 2042;
- **2042 Do Something (Lens 1)** – Local Plan with no Green Belt Loss
- **2042 Do Something (Lens 2)** – Local Plan Urban Edge
- **2042 Do Something (Lens 3)** – Majority of new homes provided along already established key public transport routes and hubs

2.11 The relevant scenario for Woodlands Garden Community is the Lens 2 assessment.

2.12 **Figure 2.1** shows the location of the Lens 2 sites.

Figure 2.1: Lens 2 Sites



2.13 **Figure 2.2** provides a summary of the Housing and Job Numbers in Lens 2, which has been taken directly from the Stage 1 Modelling Outputs Report.

Figure 2.2: Lens 2 Development Assumptions

Sector	Dwellings	Jobs	% of Dwellings	% of Jobs
Kingswood	333	138	2.5%	1.0%
Pilning, Severn Beach and Woodhouse Down	3,747	2,956	28.5%	22.2%
Filton, Bristol Parkway & Frenchay	794	999	6.0%	7.5%
Iron Acton & Charfield	114	48	0.9%	0.4%
Pucklechurch & Chipping Sodbury	7,096	7,586	53.9%	56.9%
Mangotsfield	64	27	0.5%	0.2%
Longwell Green	1,018	1,572	7.7%	11.8%
SGC Total	**13,166**	**13,326**	**100%**	**100%**

2.14 The Lens 2 assessment comprises of 13,166 new dwellings and 13,326 new employment opportunities. The Lens 2 assessment does not account for any associated transport enhancements to mitigate the impact of the Local Plan.

2.15 It is not clear from **Figures 2.1** and **2.2**, where the Woodlands allocation is accounted for within the Lens 2 assumptions. SGC confirmed in a meeting on 16 January 2024, that the modelling includes 1,170 homes, a primary school and local centre for Woodlands. The modelling assumed that there is an access onto Trench Lane and Hortham Lane, but it does not assume a link road connecting Trench Lane and Hortham Lane.

2.16 At the current stage of the Local Plan, and whilst good progress has been made, the analysis and transport modelling work has not evolved to a point that identifies transport enhancements / mitigation.

2.17 The local plan appears to acknowledge this, with the Phase 3 report (para 5.52) stating that:

However further work will be required from the site promoters to demonstrate how development here could deliver, enhance, and achieve connectivity for active travel modes, public transport and vehicles and minimise further pressure on the transport network. Our current understanding is that there is little extra capacity available particularly along the A38 at the M5 Motorway Junction 16 and therefore a solution would be required to accommodate the proposed number of new homes here.

2.18 We would welcome engagement with SGC and other developers to further develop the sustainable access strategy so that the residual vehicle impact of the development can be agreed, and which can be used to inform a wider transport strategy to support growth.

2.19 A Transport Assessment scoping report has been issued to SGC and the scope of the modelling assessment work and trip generation are currently being developed and agreed with SGC.

3.0 Existing Conditions

3.1 This section outlines the existing transport conditions, local highway network, highway safety, walking and cycling opportunities, the facilities within easy walking & cycling distance, and public transport opportunities.

3.2 This section has been prepared with consideration of the requirements for developments as set out within Section 5.14 of the South Gloucestershire New Local Plan (December 2023 consultation version), and as replicated below:

- Locate homes and jobs in places that reduce the likelihood of long travel commutes.
- Locate homes and jobs in places where active travel connections already exist, can readily be enhanced, or new connections can be delivered and provide an attractive alternative to private car travel.
- Locate homes and jobs in locations that are on existing public transport routes or could be capable of delivering high-quality, viable and reliable public transport services in future.
- Locate homes and jobs in places that avoid, where possible, a high reliance on private car-based travel or costly infrastructure packages that are unlikely to be delivered in the plan period.

Site Location

3.3 The proposed development is located in the north of Bristol, nestled in the eastern quadrant of the M4/M5 junction. The site location is shown in **Figure 3.1**.

Figure 3.1: **Approximate Site Location Plan**



3.4 The site is bounded by Hortham Lane to the north, primarily farmland to the east, Trench Lane to the south, and the M4 and M5 to the west. The site is currently used as a golf course.

3.5 There is presently one point of access to the development site from Trench Lane to the south. This is a vehicular access which services the golf club; it currently takes the form of a simple priority junction which does not benefit from any pedestrian facilities.

3.6 **Figure 3.2** shows the existing access from Trench Lane.

Figure 3.2: Existing Trench Lane Access



Existing Site Use

3.7 The proposed scheme of Woodlands Garden Community site is located in the quadrant that is formed by the M4 and M5 motorway Almondsbury interchange (Junctions 20/15). **Figure 3.1** shows the location of the proposed development site.

3.8 The site is currently occupied by the following land uses:

- 2 x 18 Hole Golf Course;
- Fishing Lake;
- Conference and wedding facilities for up to 150 guests; and
- Clubhouse and bar.

3.9 The site benefits from approximately 140 car parking spaces as well as an overspill parking area. The site therefore has the capacity generate traffic under its existing use, which would need to be factored into the traffic impact assessment for the development.

Local Highway Network

3.10 Trench Lane is a single carriageway road which operates with two-way traffic flows and forms part of the adopted highway network. Trench Lane connects the B4427 to the east with Woodlands Lane to the west. The road is currently subject to a speed limit of 30mph in the vicinity of the site access, and increases to 40mph approximately 30m east of the site access. A traffic survey was undertaken in 2016 on this carriageway, and the resultant traffic

flows are shown below in **Table 3.1**. The use of 2016 data remains appropriate as traffic volumes in the vicinity of the site have been unchanged since 2016, as demonstrated later within **Chapter 4** of this report.

Table 3.1: Trench Lane traffic flows

Period	Westbound			Eastbound		
	Flow (vehicles)	Average Speed (mph)	85th %ile (mph)	Flow (vehicles)	Average Speed (mph)	85th %ile (mph)
AM Peak (0800-0900)	609	32	36	167	33	38
PM Peak (1700-1800)	188	34	39	500	34	38

3.11 As shown in **Table 3.1**, Trench Lane experiences tidal traffic, with the dominant flow being to the west in the AM peak period, and to the east in the PM peak period; this would be as expected due to the location of the employment in north Bristol. The west and east bound 85th percentile speeds in both the peak periods are below 40mph.

3.12 Once over the motorway to the west, Trench Lane is residential by nature with a speed limit of 30mph and street lighting and footpaths present, on both sides of the carriageway.

3.13 Trench Lane connects to Woodlands Lane via a roundabout junction. Woodlands Lane connects to Bradley Stoke Way via a signalised junction.

3.14 Trench Lane, south of the roundabout junction with Woodlands Lane, terminates at a four-arm roundabout, with Ormonds Close, Ellicks Close, and Bowsland Way. Ormonds Close and Ellicks Close are both residential areas. Bowsland Way connects with Bradley Stoke Way via a five-arm roundabout (Patchway Roundabout), with Pear Tree Road, and Brook Way.

3.15 Bradley Stoke Way is a residential road, which benefits from street lighting and a shared footpath/cycleway. Bradley Stoke Way terminates at the Aztec West Roundabout, with the A38 and Aztec West. The junction of the A38 and M5 is immediately to the north of this roundabout.

3.16 To the east, Trench Lane is subject to a 40mph speed limit, and operates with two-way flows.

3.17 To the north of the development site, Hortham Lane runs in an east-west direction. A traffic survey was undertaken on this carriageway in 2016, with the resultant traffic flows shown in **Table 3.2**. The use of 2016 data remains appropriate as traffic volumes in the vicinity of the site have been unchanged since 2016, as demonstrated in **Chapter 4** of this report.

Table 3.2: **Hortham Lane traffic flows**

Period	Westbound			Eastbound		
	Flow (vehicles)	Average Speed (mph)	85th %ile (mph)	Flow (vehicles)	Average Speed (mph)	85th %ile (mph)
AM peak (0800-0900)	120	44	51	52	47	56
PM Peak (1700-1800)	64	47	55	96	49	58

3.18 As shown in **Table 3.2**, the eastbound traffic has a slightly higher average recorded speed compared to that of the westbound traffic. Again, there is a tidal traffic flow, with the majority of vehicles traveling to the west (towards Bristol) in the AM period, and the majority traveling to the east (away from Bristol) in the PM period. However, traffic flows are low with less than 190 vehicle movements in both directions during peak hours.

3.19 Hortham Lane is a two-way single carriageway subject to the national speed limit, until Hortham Community, whereby it is subject to a 30mph speed limit. Hortham Lane connects to the A38 via a signalised junction.

3.20 To the east of Hortham Lane, Gaunt's Earthcott Lane is a single carriageway road, with passing places, and is subject to the national speed limit. Gaunt's Earthcott Lane terminates at a simple priority junction with Old Gloucester Road.

Pedestrian and Cycling

3.21 This section outlines the numerous facilities within easy walking and cycling distance of the proposed development. These facilities are graphically shown in **Figure 3.3**. Detailed Walking and Cycling Isochrone Plans are provided at **Figures 3.4** and **Figure 3.5** respectively which shows walking and cycling catchments based on walking routes rather than as the 'crow flies'

3.22 There is currently footpath provision on Trench Lane over the M4, and there is space along Trench Lane within the verge to provide a footpath connection to the Woodlands Site. Cyclists are able to cycle along the Trench Lane carriageway.

The development proposals would include a new active travel link via a new bridge over the M4 to enhance pedestrian and cycle connections over the M4.

Figure 3.3: Local Facilities Plan

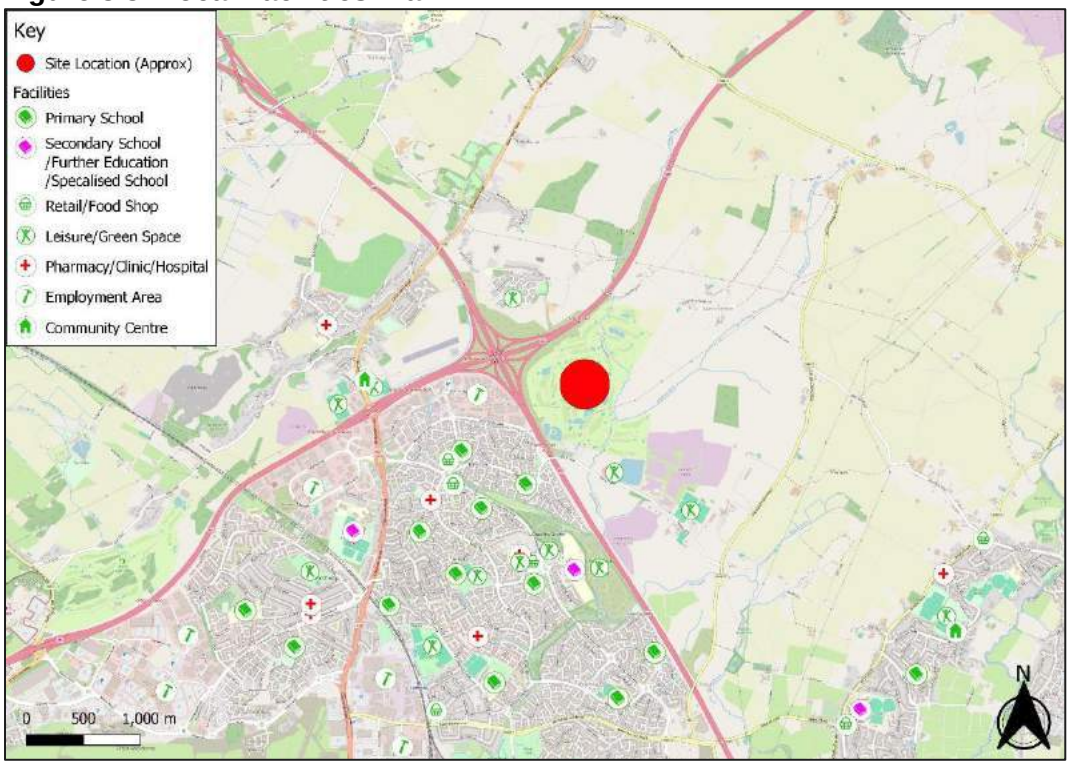
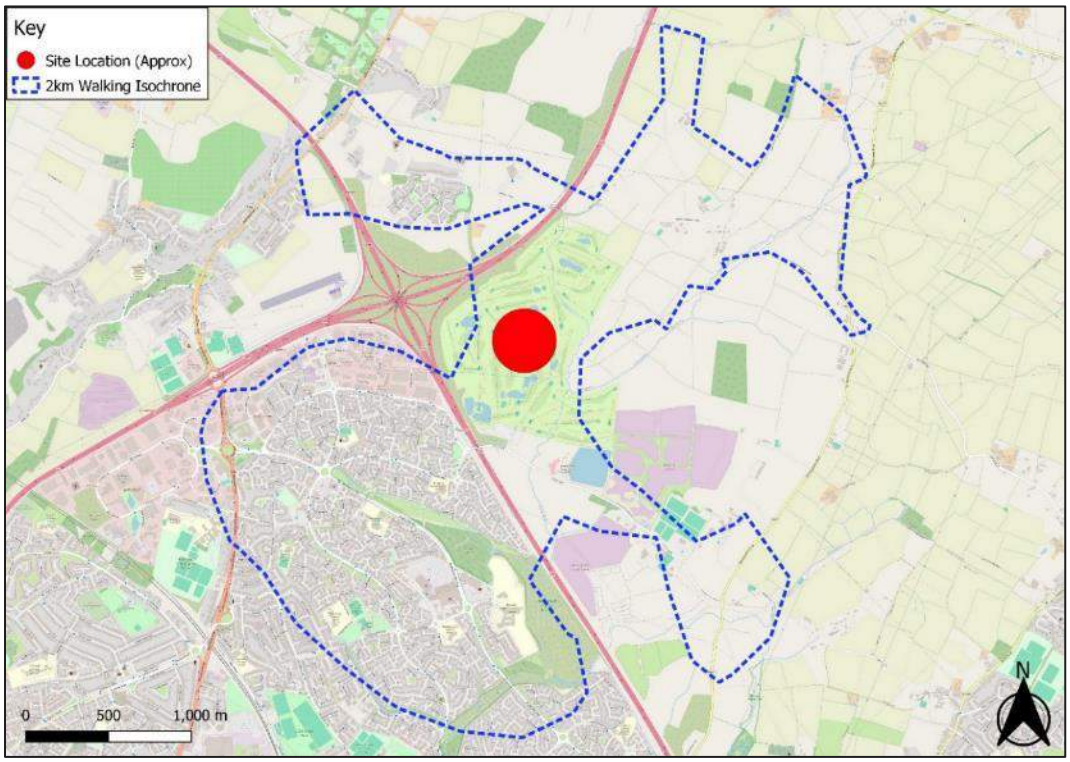


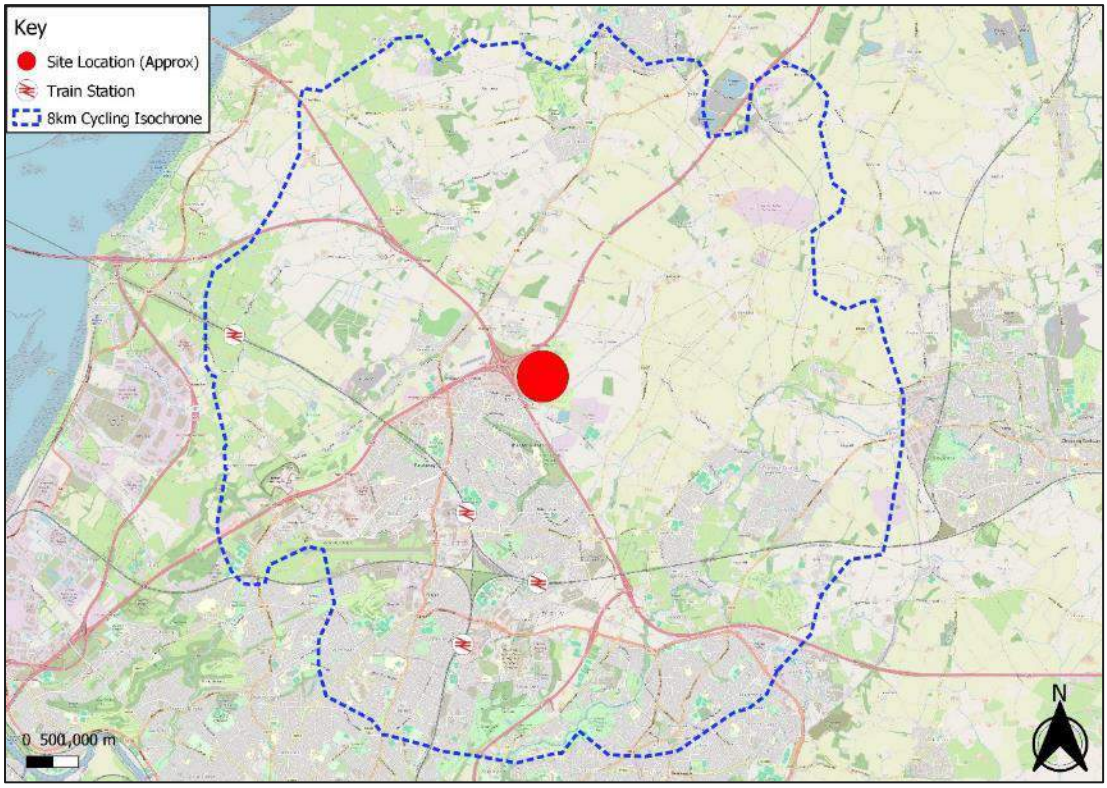
Figure 3.4: Walking Isochrone Plan



3.23 The walking isochrone shown at **Figure 3.4** includes two isochrones which use both site accesses as the starting point and are then combined to show a singular walking isochrone. Essentially, **Figure 3.4** demonstrates the locations that can be accessed within 2km of either access junction.

3.24 The isochrone takes account of the existing road and pedestrian network that is traversable on foot. For example, it does not show that pedestrians are able to walk along the adjacent motorway. The isochrone also does not account for links that do not exist, such as the proposed active travel link across the M4.

Figure 3.5: Cycling Isochrone Plan



3.25 The key local facilities that are accessible within appropriate walking or cycling distance from the centre of the site are outlined in **Table 3.3**, along with the walking and cycling journey times based on a reasonable walking speed of 1.4m/s and a cycling speed of 4.2m/s. This is not an exhaustive list and there are significant other facilities within walking and cycling distances.

Table 3.3: Local Facility Table

Facility \ Service	Name of Facility	Distance	Walking time (mins)	Cycling time (mins)
Primary School	On-Site	0	0	0
	Bowsland Green Primary School	650m	8	2
	Holy Trinity Primary School	1.2km	14	5
Secondary School	Bradley Stoke Community School	1.6km	19	6
	Patchway Community College	2.5km	30	9
Local Centre	On Site	0	0	0
	Pear Tree Road Local Centre	1.4km	17	5
GP	Bradley Stoke Surgery	1.6km	19	6
Dentist	Bradley Stoke Dental Centre	1.5km	18	6
Convenience Store	On Site	0	0	0
	Pear Tree Road Local Centre	1.4km	17	5
Supermarket	Aldi	1.5km	18	6
	Tesco	1.6km	19	6
Retail	Willow Brook Centre	1.5km	18	6
	Cribbs Causeway	5.0km	60	19
Leisure	Bradley Stoke Leisure Centre	1.6km	19	6
	North Bristol RFC	2.9km	35	11
	Almondsbury UWE FC	3.2km	38	12
Railway Station	Patchway	3.2km	38	12
	Bristol Parkway	4.3km	51	16
Post Office	Pear Tree Road Local Centre	1.4km	17	5
Library	Bradley Stoke Library	1.6km	19	6
Employment	Aztec West Business Park	2.4km	29	10
	Woodlands Business Park	1.1km	13	4

3.26 As shown in **Table 3.3**, there are a number of key facilities within easy walking and cycling distance of the proposed development. The location of these ensures the proposed development is inherently sustainable, as there is a tangible opportunity for a number of journeys to be made via sustainable means over the private car.

3.27 The location of the site in proximity to key local facilities accords with the requirement of the South Gloucestershire New Local Plan to “locate homes and jobs in places that avoid, where possible, a high reliance on private car-based travel or costly infrastructure packages that are unlikely to be delivered in the plan period” as car-based travel can be avoided by undertaking a number of day-to-day journeys on foot or by bicycle to the most local facilities.

3.28 The vast majority of facilities are located to the west of the proposed development, and require pedestrians and cyclists to cross Trench Lane over the M4.

3.29 Currently, there is limited pedestrian or cyclist facilities along Trench Lane over the M4. Cyclist would be able to cycle in the carriageway. However, whilst there are footpaths provided on either side of the Trench Lane bridge these are narrowed through the provision of safety barriers. There are also no formal footpaths along Trench Lane to the east of the existing bridge.

3.30 This will be addressed via the introduction of a pedestrian and cycle footbridge over the M4, details of which is provided at **Chapter 4** of this report.

3.31 Based on the local facilities presented in **Figure 3.2** and **Table 3.3**, and the walking and cycling isochrones, we envisage that the key pedestrian and cyclist desire lines will be between the site and the following locations:

- Aztec West;
- Bristol Parkway Railway Station;
- Willow Brook Retail and Bradely Stoke Leisure Centre (via route to Bristol Parkway Rail Station);
- Woodlands Business Park;
- Bristol City Centre; and
- Cribbs Causeway.

3.32 These locations will be key destinations for leisure, shopping, and commuting trips (both local and regional), and therefore will attract a high proportion of trips from the proposed development.

3.33 As part of the access strategy for the development, a full assessment of the routes to these locations will be provided, and where necessary, improvements will be proposed. Or alternatively it has been suggested by SGC that an active travel strategy could be developed as part of the local plan as mitigation for the wider housing growth it proposes, and the development at Woodlands Garden Community could provide funding towards these wider improvements.

3.34 Enhanced active travel provision will allow for the requirement of South Gloucestershire New Local Plan to “locate homes and jobs in places where active travel connections already exist, can readily be enhanced, or new connections can be delivered and provide an attractive alternative to private car travel” to be met.

3.35 This review will build upon the assessment undertaken by SUSTRANS to support the 2016 Transport Strategy.

3.36 A high-level summary of the routes is presented within this report following the assessment of public transport availability.

Public Transport

3.37 This section outlines the numerous public transport opportunities located within close proximity to the proposed development.

3.38 This section demonstrates that the site is situated within close proximity to existing public transport links, particularly buses, which accords with the requirement of South Gloucestershire New Local Plan to “locate homes and jobs in locations that are on existing public transport routes or could be capable of delivering high-quality, viable and reliable public transport services in future.”

Bus

3.39 The closest bus stop is presently located approximately 350m from the southern access, either on Trench Lane, or Woodlands Lane. The bus stops on Trench Lane benefit from shelters, bus timetable information, and street furniture, whilst the bus stops on Woodlands Lane benefit from a flag and pole arrangement.

3.40 Bus services 73 and CS7 call at these stops. The 73 service provide frequent services to Aztec West, Bradley Stoke, Filton, Bristol City Centre, Bristol Temple Meads, Knowle and Hengrove. The CS7 service is a school service operating once per day in each direction.

3.41 An additional local bus service, T1 Lynx, can be accessed via bus stops outside Bradley Stoke Leisure Centre on Bradley Stoke Way, within an approximate 1000m walk from the site access. The T1 service provides frequent services to the centre of Bristol via Bradley Stoke.

3.42 These services are summarised below in **Table 3.4**.

Table 3.4: Local Bus Service Summary

Service	Route	Direction	First/Last	Frequency (Each Direction)
73	Aztec West – Bradley Stoke – Filton – Bristol City Centre – Bristol Temple Meads – Knowle – Hengrove	Aztec West	0622/2350	2 per hour
		Hengrove	0606/2313	
CS7	Stoke Gifford – Almondsbury – Marlwood School – Thornbury	Stoke Gifford	1606	1 per day
		Thornbury	0752	
T1	Thornbury – Bradley Stoke – Bristol City Centre	Thornbury	0631/0001	3 per hour
		Bristol City Centre	0603/2351	

3.43 As shown in **Table 3.4**, the primary service is the number 73, which operates extended service hours, at a regular frequency, from within 400m of the site access. This is supported by the T1 Lynx service which operates frequently from bus stops within 1000m of the site access.

Demand Responsive Transport (WESTlink)

3.44 WESTlink is an on-demand minibus service that allows residents to book their bus journeys through an app, website, or phone. It forms part of the largest on-demand bus scheme in the UK. It aims to reconnect communities by offering people currently without a local service the opportunity to get back on the bus. WESTlink buses can provide collection from areas that do not have a physical bus stop, and therefore there is potential for future residents at the site to be able to access bus services from their doorstep.

3.45 The site sits within the Northern WESTlink area, and within this area mini-bus services provide on-demand local connections to key transport nodes within the area including Thornbury and Yate. Typically, WESTlink buses arrive within 5-45 minutes of booking[2], and a real-time map within the app can be used to identify the current location of the minibus.

3.46 At present, the WESTlink service is operational from 07:00 to 19:00 on weekdays and Saturdays. No WESTlink service is available on Sundays. Single fares are available for £2 for adults, and concessionary bus passes are accepted. Bookings and payments are able to be made online, on the WESTlink app, or by phone.

[2] https://n-somerset.gov.uk/my-services/parking-travel-roads/transport-travel/bus-travel/westlink

3.47 The WESTlink service provides the opportunity for future residents of the site to access locations which otherwise would only be accessible by car, considering the distances and lack of alternative options available.

Metrobus

3.48 The closest Metrobus stop is situated adjacent to Bradley Stoke Leisure Centre, within 1,000m of the site access by foot.

3.49 The use of a pedestrian link through Patchway Brook between Ellicks Close and Bradley Stoke Way means that you can walk to the metrobus bus stop within a distance of approximately 1km. The Metrobus stops benefit from digital timetable information, ticket machines, and bicycle parking stands to encourage sustainable multimodal travel. Whilst the stop is 1km from the site, infrastructure is in place to encourage those that chose to use the Metrobus to cycle to the stop. Metrobus services operate with a higher level of reliability compared to typical local bus services, with separate bus lanes and guided busways for parts of the journey allowing the services to avoid queuing traffic.

3.50 The M1 metrobus service operates from this location, and provides services between Cribbs Causeway and Hengrove Park approximately every 15 minutes. On the M1, Bristol City Centre is accessible within a 30-minute journey from Bradley Stoke Leisure Centre.

Rail

3.51 The two nearest railway stations to the proposed development are Patchway and Bristol Parkway, at 3.2km and 4.3km from the southern access point respectively. There are four cycle parking stands, providing space for 8 cycles, and 15 car parking spaces at Patchway, and 156 cycle parking spaces, and 1140 car parking spaces at Bristol Parkway; this enables multimodal sustainable travel. A number of locations can be accessed from Patchway and Bristol Parkway, as outlined in **Table 3.5**.

Table 3.5: Rail Summary Table

Originating Station	Destination	Duration	Frequency
Patchway	Bristol Temple Meads	13 minutes	Hourly
	Cardiff Central	48 minutes	Hourly
Bristol Parkway	Bristol Temple Meads	12 minutes	4 per hour
	Swindon	25 minutes	2 per hour
	Bath Spa	28 minutes	1 per hour
	Cardiff	40 minutes	2 per hour
	Taunton	45 minutes	1 per hour
	Reading	58 minutes	2 per hour
	Exeter St David's	1hr 12 minutes	1 per hour

3.52 As can be seen from **Table 3.5**, a wide range of locations can be accessed from the proposed development, within a reasonable commute time. It should be noted that only direct services have been shown, and that a number of destinations can be accessed more frequently if changes are made.

Micro-Mobility

TIER Scooters & E-bikes

3.53 In October 2024 TIER began to roll out a fleet of electric scooters and E-bikes across Bristol and South Gloucestershire. The site sits on the boundary of the area of operation, and scooter parking spaces are provided on Bradley Stoke Way approximately 1.5km from the site. The extent of the area of operation and location of closest hire points are shown at **Figure 3.6.**

Figure 3.6 - TIER Area of Operation and Parking Locations



3.54 There is potential to explore the extension of the area of operation with TIER, and to provide scooter and e-bike bays within the site.

3.55 TIER scooters and E-bikes are hired on a short-term or long-term basis through an app with prices starting from 99p unlock fee, and 16p a mile. A range of further passes are available.

3.56 Within the Bristol area there are approximately 100 parking bays, which allows for travel by e-scooter to a variety of locations across the region.

3.57 The presence of the e-scooter scheme has significant potential to influence the ways in which future residents travel

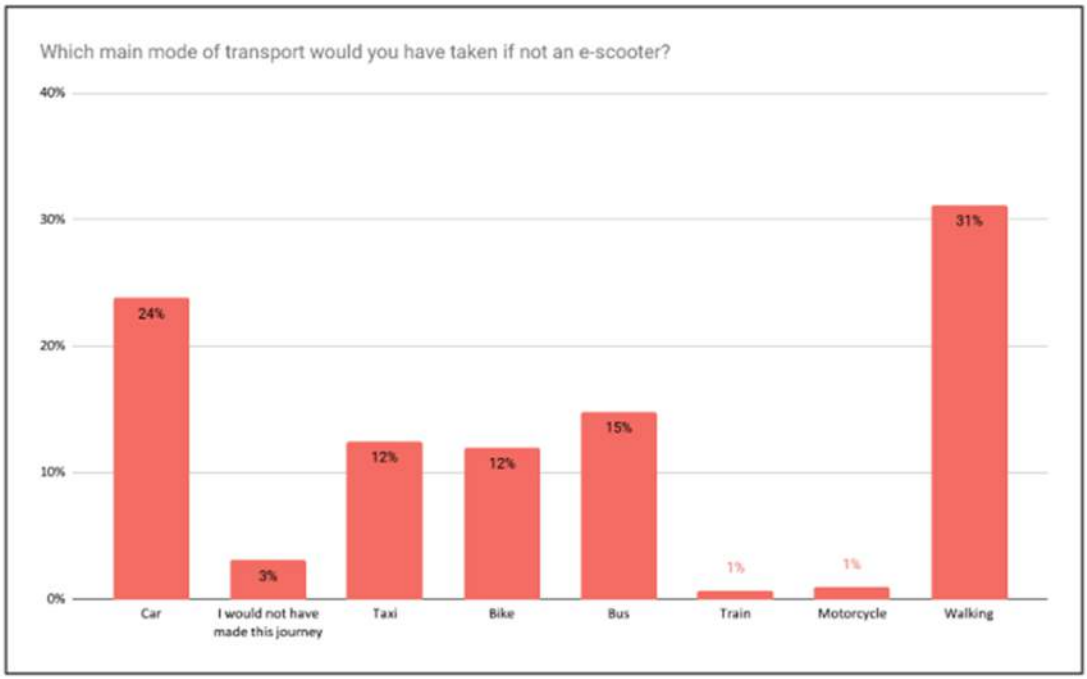
3.58 The e-scooter scheme in Bristol was previously operated by Voi. Following the initial 12-month trial in Bristol & Bath, the West of England Combined Authority (WECA) published a review together with Voi outlining the findings and impacts of the trial[3].

3.59 It was reported that in Bristol, 36% of e-scooter users would have instead made the trip by car or taxi. This is shown at **Figure 3.7**. Voi estimated that in Bristol and South

[3] https://travelwest.info/app/uploads/2022/04/WECA-x-Voi-escooter-trial-12-Month-Report.pdf

Gloucestershire alone 874,000 trips had been replaced by an e-scooter within the first 12 months of the trial alone.

Figure 3.7 - Voi Bristol & South Gloucestershire Mode Shift Survey



Key Desire Lines

3.60 As aforementioned, the key desire lines are expected to be between the site and the following locations:

- Aztec West;
- Bristol Parkway Railway Station;
- Willow Brook Retail and Bradely Stoke Leisure Centre (via route to Bristol Parkway Rail Station);
- Woodlands Business Park;
- Bristol City Centre; and
- Cribbs Causeway.

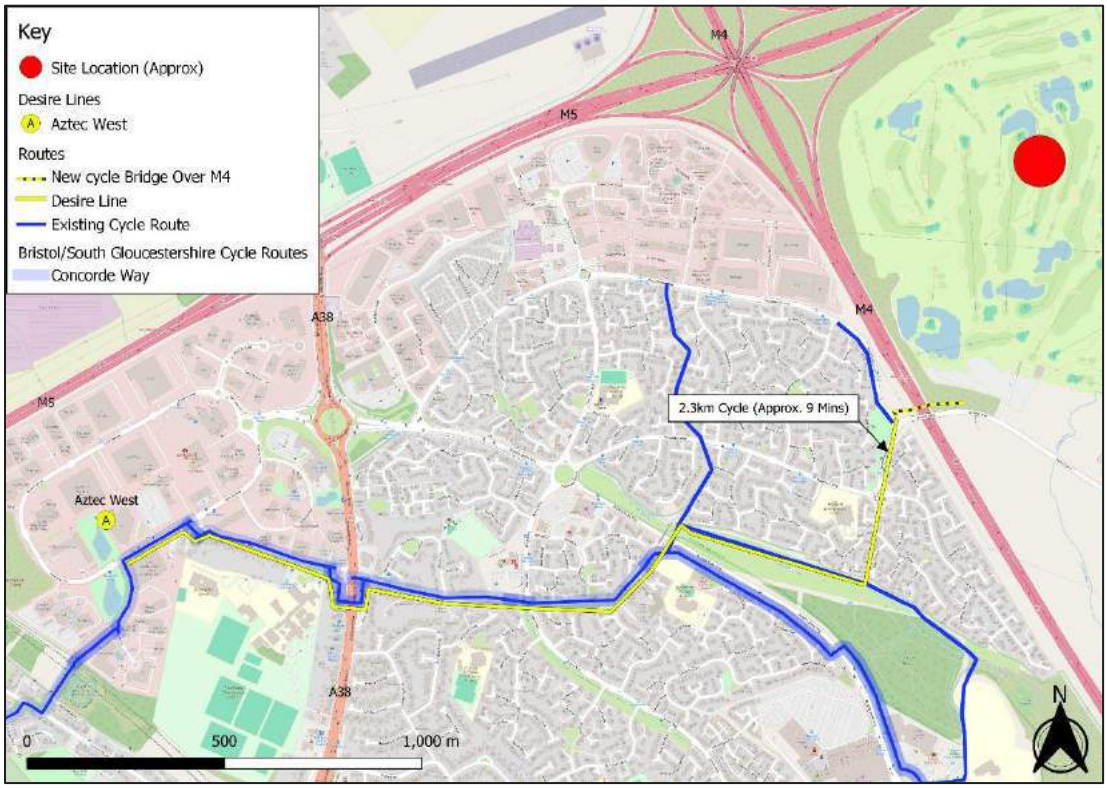
3.61 This section provides a summary of the existing accessibility to these locations. A full review will be contained within a supporting Transport Assessment.

Aztec West

3.62 Aztec West is a large employment site, which is likely to be the workplace of a significant number of residents living at Woodlands. Aztec West is located approximately 2.4km walk/cycle from the site (from the proposed location of the pedestrian/cyclist overbridge), which equates to a walking journey time of 29 minutes based on a typical walking speed of 1.4m/s, or a cycling journey time of 10 minutes based on typical cycling speeds of 4.2m/s.

3.63 **Figure 3.8** presents the expected journey route for pedestrians and cyclists.

Figure 3.8: Desire Line and existing Cycle Route to Aztec West



3.64 Pedestrian footways are provided adjacent to all roads on this route, and cyclists are required to cycle on-road. Alternatively, the existing 73 bus service, which serves stops adjacent to the site on Trench Lane, can be used to access Aztec West within a journey time of approximately 14 minutes. The 73 service operates at a frequency of once every 30-minutes.

Bristol Parkway Railway Station and Willow Brook Retail Park

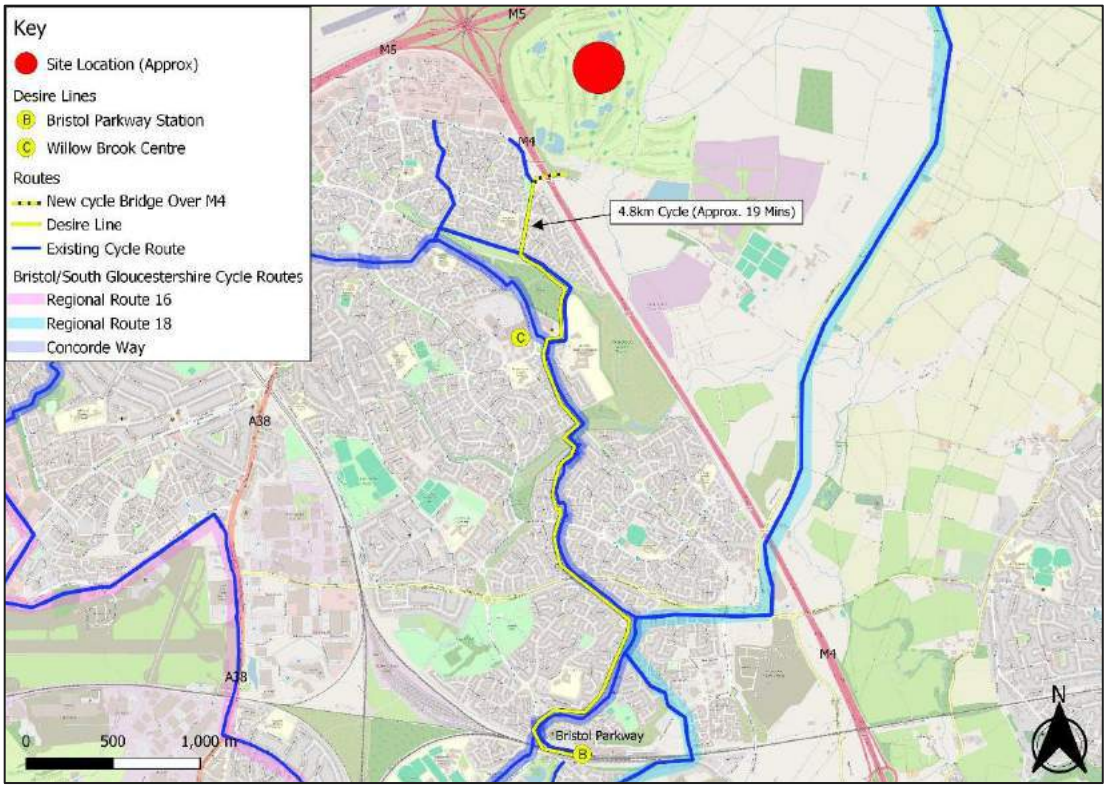
3.65 Bristol Parkway Railway Station is a key commuter hub, situated approximately 4.4km by bicycle from the proposed pedestrian/cycle access on Trench Lane. This equates to a cycling journey time of approximately 17 minutes based on a typical cycling speed of 4.2m/s.

Bristol Parkway provides frequent services to a plethora of destinations including London, Cardiff, Bristol, and Manchester and is therefore expected to attract a number of trips from the proposed development.

3.66 Willow Brook Retail Park is expected to be a key destination for residents for the retail offering available, with a number of chain stores provided. The retail park is also supplemented by Bradley Stoke Leisure Centre. The retail park is situated 1km from the site access and this is accessible within a journey of 12 minutes on foot, or 4 minutes by bicycle. Willow Brook Retail Park is situated along the route that cyclists would take to access Bristol Parkway Railway Station and therefore the two destinations have been considered in the same analysis.

3.67 **Figure 3.9** shows the expected journey route for cyclists.

Figure 3.9: Existing Route to Bristol Parkway Railway Station



3.68 The majority of the route between the site and Bristol Parkway can be undertaken off-road, along Patchway Brook and Stoke Brook. The areas in which on-road cycling is required is typically within residential areas with low-speed limits and volumes.

3.69 With the exception of the section of route to be provided as part of the development along Trench Lane, Willow Brook Retail Park is accessible entirely through the existing cycle network.

3.70 Alternatively, the 73-bus service which serves stops on Trench Lane can be used for access to Bristol Parkway with a journey time of approximately 17 minutes, and a frequency of once every 30-minutes.

3.71 The site is also located within 3.2km walk / cycle distance from Patchway station which provides a good level of service but slightly reduced when compared to Bristol Parkway.

Woodlands Business Centre

3.72 Woodlands Business Centre is a local employment area situated to the north west of the development. It can be accessed within approximately 1000m from the active travel access point. This equates to a journey time of 12 minutes for pedestrians and 4 minutes for cyclists.

3.73 **Figure 3.10** presents the expected walking and cycling route from the site access to Woodlands Business Centre.

Figure 3.10 – Existing Route to Woodlands Business Centre



3.74 There is currently a pedestrian footway on both sides of Woodlands Road for the entire route between the site access and Woodlands Business Centre. The traffic flows are low, as demonstrated by traffic surveys undertaken, which is conducive to cyclists and vehicles operating simultaneously safely.

Bristol City Centre

3.75 Bristol City Centre is a large employment area, and is also likely to attract a number of shopping and leisure trips from the development.

3.76 The cycling distance between the site and Bristol City Centre is approximately 13km and therefore the propensity for residents to walk or cycle this route is limited.

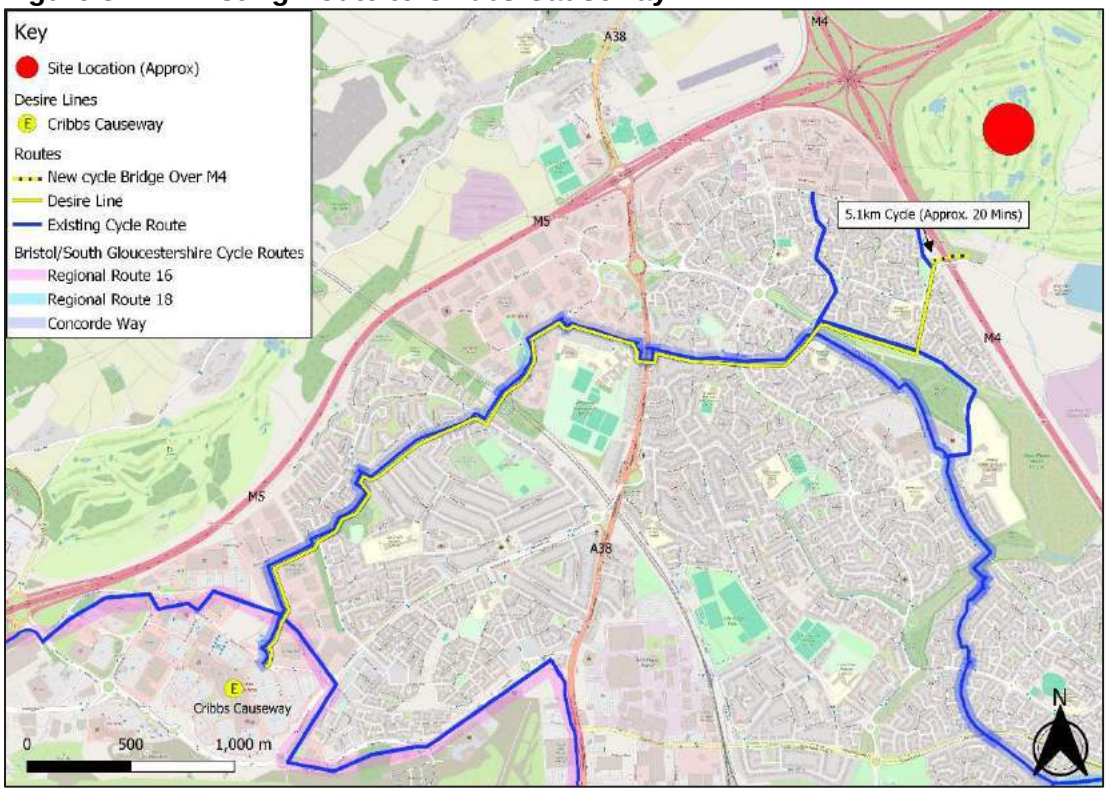
3.77 The public transport offering between these locations is of good quality, with the T1 Lynx, or M1 Metrobus service providing access between Bradley Stoke Leisure Centre (accessible within a 12-minute walk) and Bristol City Centre within approximately 20 minutes. Services are available from Bradley Stoke Leisure Centre every 10 minutes.

Cribbs Causeway

3.78 Cribbs Causeway is situated within a 5.2km cycle from the development. This equates to a journey time of 21 minutes assuming a reasonable cycling speed of 4.2m/s. It is expected that a considerable number of shopping, leisure and some employment trips will be made to this location.

3.79 **Figure 3.11** presents the expected cycling route from the site access to Cribbs Causeway.

Figure 3.11: Existing Route to Cribbs Causeway



3.80 A significant proportion of the route between the proposed development and Cribbs Causeway follows sections of road which benefit from off-road cyclist provisions such as shared footway/cycleway. This is conducive to cyclist movements.

3.81 Alternatively, the M1 metrobus service, which serves the bus stops adjacent to Bradley Stoke Leisure Centre (approximately 1km from the site access) can be used for access to Cribbs Causeway with a journey time of 13 minutes by bus.

Access to Employment

3.82 The 2018 Transport Study provided an assessment determining how many jobs were available within a distance of 2km, 5km, or 8km, which are distances that are considered suitable for walking or cycling.

3.83 The study overlaid the respective isochrones onto ward boundaries and used 2011 census data to determine the number of workers, and therefore jobs, that were present in each ward. Where only part of a ward was covered, the number of jobs was adjusted appropriately.

3.84 Updated census data for 2021 is available, however due to the COVID-19 restrictions being in place during the data collection phase, it is likely that the number of workers (and therefore jobs) in each ward will be under-represented as many workers would have likely been working temporarily from home, or had been furloughed.

3.85 Based on this, it is considered appropriate that the use of 2011 census data is continued, however it should be caveated that significant economic growth has occurred in Bristol since 2011 and therefore additional jobs will be available within appropriate cycling distance from the site. The data presented is considered therefore to be a worst-case scenario.

3.86 **Table 3.6** summarises the number of existing jobs accessible from Woodlands on foot and by bike. This is based on 2011 employment numbers and does not account for any additional development that was due to be delivered through the now withdrawn Joint Spatial Plan or the current Local Plan provision.

Table 3.6 – Jobs Available from Woodlands

25-Minute Walk	19-Minute Cycle	30-Minute Cycle
2km	**5km**	**8km**
4,833 jobs	25,823 jobs	61,452 jobs

3.87 The proximity of Woodlands to a significant number of jobs accessible by foot or by bicycle accords with the requirement within South Gloucestershire New Local Plan to “locate homes and jobs in places that reduce the likelihood of long travel commutes”.

Summary

3.88 This section of the report confirms that the site is located in a highly accessible location and is suitably located to provide the opportunity to encourage trips by sustainable modes. The site is located within active travel distances of key area including Aztec West, Cribbs Causeway, UWE, Filton, and Bristol Parkway Rail Station which provide significant employment retail, education, health, and leisure facilities. Future residents could make use of the existing walking and cycling infrastructure that can be used to access these areas.

3.89 Bus routes are located nearby which provides connections to the areas identified above as well as Bristol City Centre.

3.90 Bristol Parkway rail station is located within a comfortable cycle ride from the site which provides frequent services to Bristol, Cardiff, Reading, and London.

3.91 The following key areas of enhancement should be considered further:

- Provision of Active Travel Bridge between the site and Woodlands Lane to the west;
- Provision of an Active Travel Link connecting the Trench Lane Roundabout with off-site cycle links (including Concorde Way);
- Review of existing off site cycle links and potential enhancements to these links;
- Enhance cycle parking facilities at the Metrobus stops on Bradley Stoke Way;
- Provision of additional cycle parking at Patchway Rail Station;
- Liaison with bus operators to potentially route bus services through the site.

4.0 Changing Mobility Habits

Introduction to Changing Mobility Habits

4.1 There is demonstrable evidence to suggest that modern attitudes towards travel and the intergenerational effect and attitudes toward movement are changing rapidly, and that transport policy is seeking to keep abreast of these.

4.2 This change in attitude towards travel and mobility has been facilitated by a number of factors including the rapid growth in smart phones with internet access, combined with location services enabling users to access, order and pay for transport services in an integrated way, as well as the recent Covid-19 pandemic and a renewed desire for local living.

4.3 Car use has been considered the dominant travel mode in the UK for decades, and this has led to a Predict and Provide (P&P) approach to development planning. P&P involves predicting a demand (usually car) and trying to make it fit on the existing road network; where it didn't fit, additional capacity was built in. In its place a Vision and Validate (V&V) approach is adopted for Woodlands Garden Community; this helps to advance sustainably designed, low carbon and future-proofed settlements by placing greater importance on the vision. This defines what the vision will allow thus placing greater importance on sustainable (including virtual) mobility. Traffic here is a function of road space rather than the other way around, and it is that available road space that dictates demand.

4.4 To support the V&V approach the rapidly changing use of cars and attitudes to travel in recent years is presented in this section.

Covid-19 and the Shift in Trends

4.5 The Covid-19 pandemic has provided a step-change in working habits when it comes to revealing to employers and employees alike, that working from home or from a 'Third Place' is a viable and attractive option for every-day life. During the first Covid-19 pandemic in the UK, every worker who had the ability to work from home did so.

4.6 More than working habits however, the Covid-19 pandemic has shown people the benefits of local living and taking an active part in their local communities, something which a pattern of building dormitory settlements has eroded. It has never been more important to build for communities where residents can visit friends and family within their local neighbourhood, get a coffee, or pop to a shop for milk all within a walk or cycle from their home.

4.7 During the various lockdowns in the UK traffic on the roads reduced to unprecedented levels, and whilst these levels have very much bounced back as restrictions have eased, it demonstrates the extreme end of the scale that can be achieved as people learn to change habits.



4.8 New development must grasp the opportunities to provide for the change in behaviour by designing for liveability from the very outset.

Traffic Levels

4.9 Traffic being a function of road space is demonstrated time and time again where national and local traffic forecasts predict a steady increase in traffic in general accordance with population and economic growth, but this increase in traffic does not always occur despite this growth happening.

4.10 An assessment of trends in traffic flows within the vicinity of the site and in the area of Aztec West has been undertaken and the results presented below.

Local Road Network

4.11 Traffic survey data for between 1993 and 2007 has been obtained from the Bristol Open Data website[4] for the A38 between M5 Junction 16 and the Aztec West Roundabout (survey reference point 1050). This data is presented in **Table 4.1** as well as the 2016 traffic survey data that was used in the 2018 Transport Study.

Table 4.1: Traffic Data A38 Aztec West

Year	0800 to 0900	1700 to 1800
1993	4998	3376
1994	4824	4497
1995	4903	4046
1996	4982	4548
2001	3738	3903
2004	4641	5164
2006	4660	4571
2007	5030	4745
2016	4533	4349

4.12 **Table 4.1** shows that between the years of 1993 and 2016, the 2016 flows are lower in all years apart from 2001 for the AM peak hour. In the PM peak hour, 2016 flows are lower than all years apart from 1993, 1995 and 2001. This confirms that between 1993 and 2016 traffic flows have been relatively consistent with no real growth. Traffic flows on this link were higher in 1994 that what they were in 2016 in both peak hour periods, demonstrating that despite economic growth in the area, there has not been relative traffic growth.

[4] Traffic survey locations | Traffic survey locations | Open Data Bristol

4.13 From 2016 to 2024 there is no data available for this section of the network. ATC surveys have been undertaken on the local road network (January 2024) including Gloucester Road, Woodlands Lane, Trench Lane, and Brooke Way, and this is then compared to the 2016 traffic surveys that informed the 2018 Transport Study. Comparisons of the 2016 and 2024 surveys are provided in **Table 4.2**.

Table 4.2: Traffic Survey Data Comparison (2016 and 2024)

	AM Peak 0800-0900			PM Peak 1700-1800		
Location	**2016**	**2024**	**Change**	**2016**	**2024**	**Change**
Gloucester Road	2080	1842	-238	2310	1883	-427
Woodlands Lane	1182	580	-602	997	760	-237
Bowsland Way	265	266	1	277	224	-53
Trench Lane South	229	266	37	257	224	-33
Brooke Way	766	775	9	1004	1010	6

4.14 The data generally shows that traffic has reduced within the area. In particular, Gloucester Road and Woodlands Lane which are the busiest roads have experienced significant reductions in flows since 2016. This further demonstrates that since the original Transport Study was produced in 2018 there has been no growth on the local highway network.

Strategic Road Network

4.15 Further analysis of traffic data on the Strategic Road Network (SRN) including the M4 and M5 has been undertaken utilising data from the National Highways traffic database, WebTRIS. This considers mainline traffic flow changes between 2016 (when the surveys that informed the 2018 Transport Study were undertaken) and 2023 (the most recent year of available data). A summary of the location points and change in flow is provided in **Table 4.3** and comprises the 4 approach arms to the M4 Junction 20/M5 Junction 16. The data presented is weekday average data for the month of February, which is a neutral month.



Table 4.3: SRN Traffic Flow Trends

Location	Direction	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
		February		% Change	February		% Change
		2016 Flow	2023 Flow		2016 Flow	2023 Flow	
South of M4 J20	Northbound	4,180	4,204	0.57%	5,132	4,710	-8.22%
	Southbound	4,576	4,409	-3.65%	4,835	4,613	-4.59%
	Two Way	8,756	8,613	-1.63%	9,967	9,323	-6.46%
North of M4 J20	Northbound	1,746	2,043	17.01%	3,022	3,138	3.84%
	Southbound	2,692	3,139	16.60%	2,120	2,370	11.79%
	Two Way	4,438	5,182	16.76%	5,142	5,508	7.12%
East of M5 J16	Eastbound	2,767	2,599	-6.07%	3,390	3,197	-5.69%
	Westbound	3,388	3,223	-4.87%	3,037	2,898	-4.58%
	Two Way	6,155	5,822	-5.41%	6,427	6,095	-5.17%
West of M5 J16	Eastbound	4,021	3,901	-2.98%	4,687	4,570	-2.50%
	Westbound	3,842	3,917	1.95%	4,254	4,148	-2.49%
	Two Way	7,863	7,818	-0.57%	8,941	8,718	-2.49%

4.16 As shown in **Table 4.3** there has been a reduction in two-way traffic flows on the M4 south of J20, and on the M5 to the east and west of M5 Junction 16. Reductions in two-way flows of over 6% have been recorded.

4.17 It is noted that there has been an increase in vehicle movements on the M4 north of M4 Junction 20. Further analysis of traffic flow data on this part of the network shows a correlation between increased flow of traffic and the removal of the M4 tolls to Wales. **Figure 4.1** and **Figure 4.2** shows the changes in flow on this section of the network between 2014 and 2023 (all years where data is available). We have removed 2021 and 2022 data as this may have been impacted by COVID 19. 2020 flows are obtained for February before COVID-19 lockdown restrictions came into force.

Figure 4.1: North of M4 Junction 20 (AM Peak Hour 0800 to 0900)

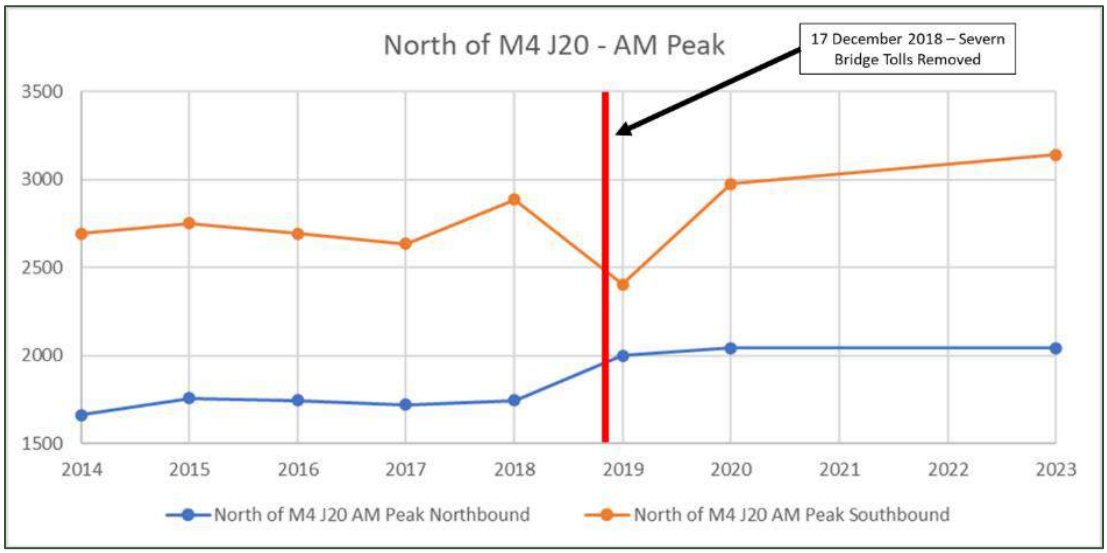
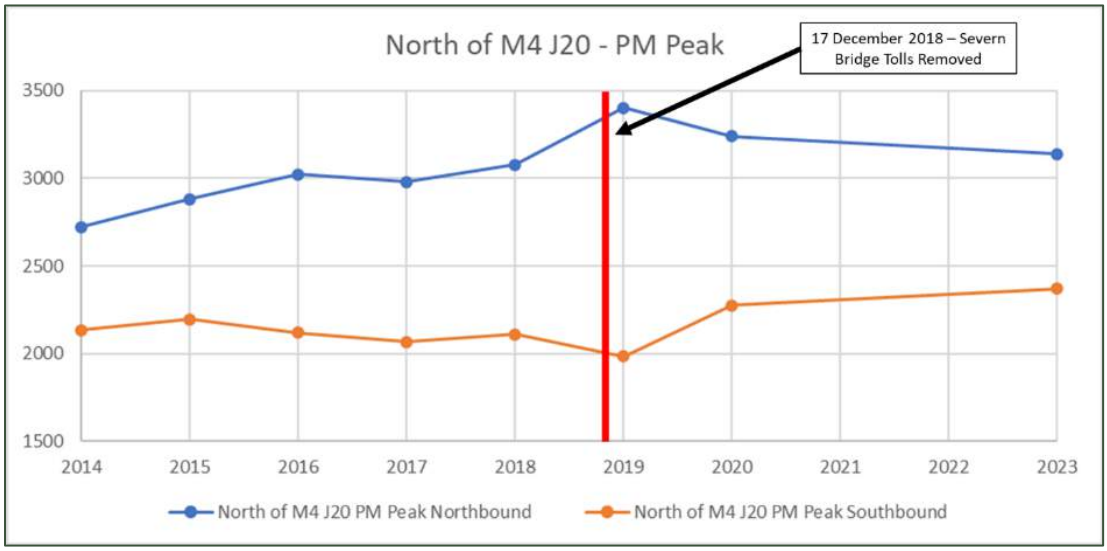


Figure 4.2: North of M4 Junction 20 (PM Peak Hour 1700 to 1800)



4.18 Before the data within **Figure 4.1** and **Figure 4.2** is analysed it should be noted that there is a dip in flows in 2019 for the Southbound flow in both peak hour periods. This is due to road works at the start of 2019 which extended into February, Which restricted southbound traffic to a single lane (southbound) and should therefore be discounted[5]. With this in mind there is a clear correlation with the removal of Severn Bridge Toll and increased traffic flows. This indeed supports the principles that increasing road capacity and making driving more

[5] https://www.bristolpost.co.uk/news/bristol-news/severn-bridge-roadworks-abandoned-after-2541671

convenient and attractive will simply increase the demand for vehicle trips. As such the increase experienced in this location is down to enhanced traffic conditions and lower costs making driving along this route more attractive.

4.19 As a result of the Covid-19 pandemic, traffic levels visibly decreased in 2021. Whilst traffic levels are, as of 2023, somewhat more reflective of the levels recorded pre-pandemic, it is evident that this change in habit is here to stay. The ability to work from home, for example, has remained a key factor in maintaining decreased traffic flows especially across the typical peak periods, and is an example of one of many factors which are contributing to traffic flows which are not quite in line with those predicted nationally and locally.

Conclusion

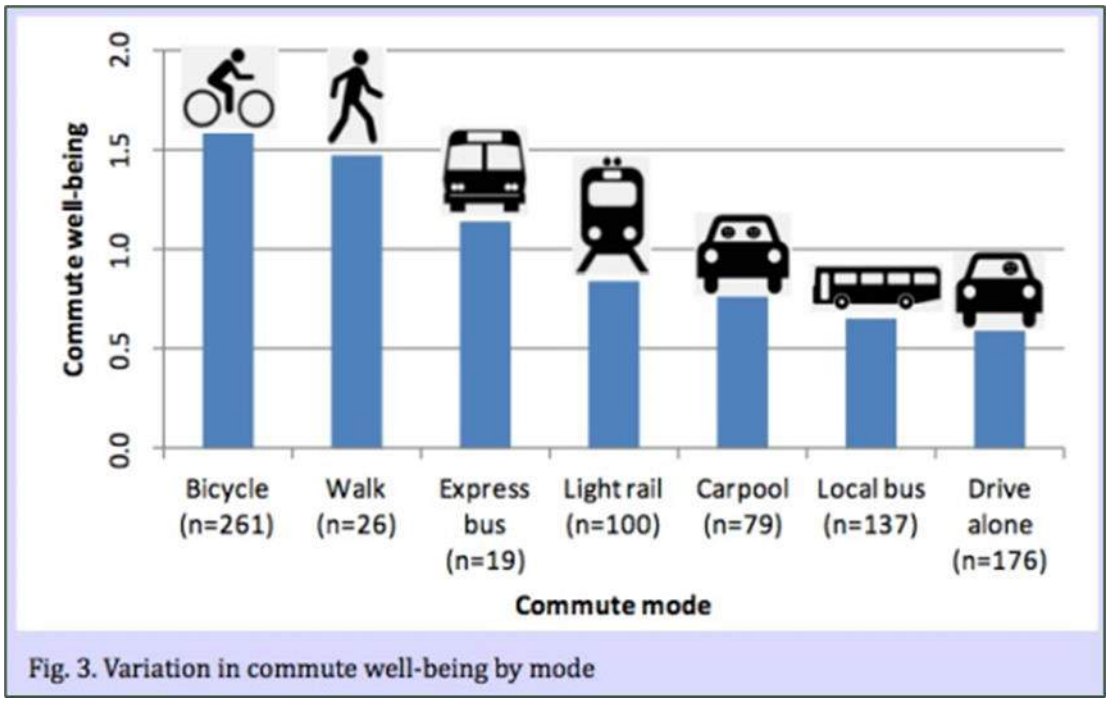
4.20 The data presented above confirms that there has been no growth on the local or strategic road network within the vicinity of the site despite there being continued economic growth in the area.

Commuter Wellbeing

4.21 Research published in the Journal of Transport and Health (March 2017, Volume 4) into commuter wellbeing ranked different modes of transport with car driver alone ranking the lowest and bicycle and walking featuring the highest. This bolsters the case for local living and for new settlements to be designed to accommodate active travel users as a highest priority. This is illustrated in **Figure 4.3.**



Figure 4.3: Commute Wellbeing



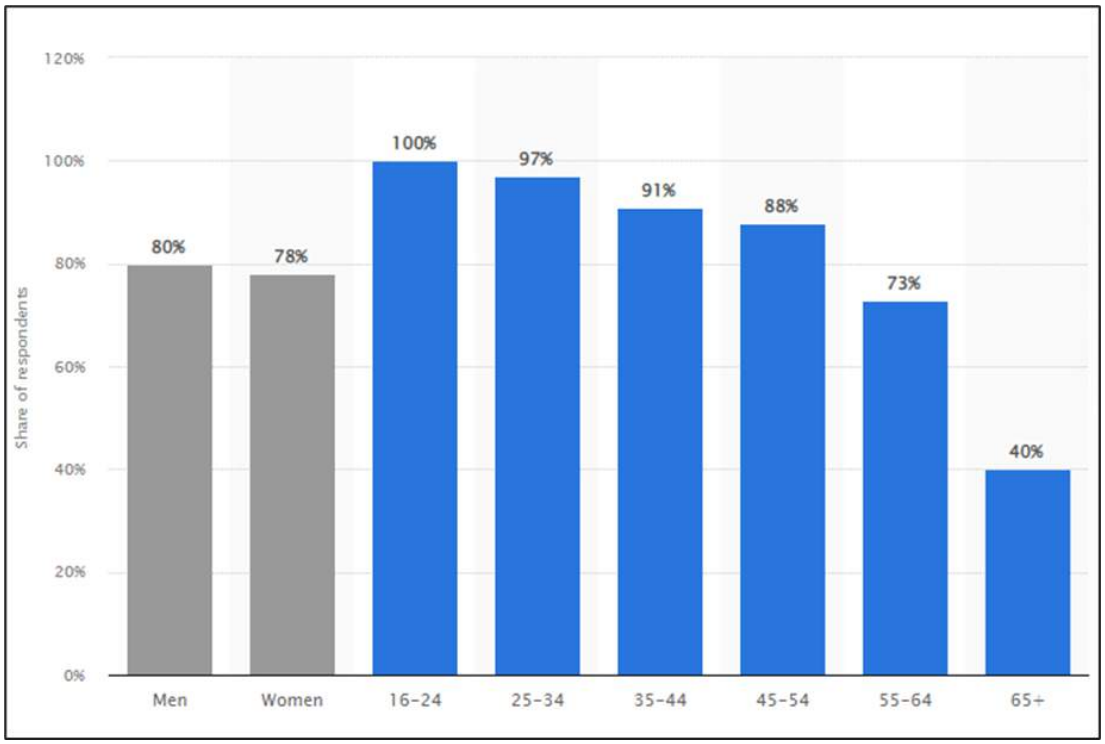
Smith et al 2-16: Commute well-being differences by mode

Intergenerational Divide

4.22 The intergenerational divide has increasingly shown how travel patterns and trends in movement patterns vary by age.

4.23 **Figure 4.4** shows mobile internet access by age group in Great Britain.

Figure 4.4: Internet Access By Age Group



(Statista 2019[6])

4.24 It is clear that younger generations are increasingly using their smart phones to access mobility and including payment for transport related activity, be it bus and rail journey planning and payments, e-scooters and e-bikes, taxi bookings such as Uber or demand responsive bus travel. This also extends to working and shopping all done virtually.

4.25 Advances in technology are quickly changing the way we live, and changing how we value time, how we value possessions, and how we achieve Mobility. Research undertaken in 2020 by Deloitte[7], states that the impact of the COVID pandemic has acted as a catalyst, speeding up consumer digital usage and introduced this new trend at a quick rate. The Deloitte research shows that 38% of respondents did more shopping online relative to pre-lockdown levels and half of these would maintain this behaviour post-lockdown. There has been a 22% increase in the number of people using online banking as a result of the COVID pandemic and of these 60% would continue to use online banking in future. 14% more

[6] https://www.statista.com/statistics/275985/mobile-internet-penetration-in-great-britain-by-age-and-gender/#:~:text=80%20percent%20of%20men%20aged,with%2078%20percent%20of%20women.&text=As%20of%202018%2C%2095%20percent,34%20years%20owned%20a%20smartphone.

[7] https://www2.deloitte.com/uk/en/pages/technology-media-and-telecommunications/articles/digital-consumer-trends-lockdown-behaviour.html

people in the study have used virtual appointments with medical staff and of these 25% would continue to do so in future.

Car Ownership

4.26 In the past there has been significant growth in the number of households with access to a personal vehicle, spurred in part to the decreasing relative cost of owning a vehicle over the same period (as shown by the National Travel Survey). This is despite vehicles being parked on average 80% of the time.

4.27 With changing attitudes to car ownership and increased opportunities to relinquish ownership of a car (such as car clubs), private car ownership is anticipated to decline.

4.28 This reflects the changing attitudes of younger generations such as millennials towards the car, where Prophet Marketing Agency have reported the following:

- 67% of millennials would rather buy a used car and spend the saved money on other things;
- 65% say that the latest smartphone has more value to them than the recent model of a car;
- 50% agree the car is losing its significance as a status symbol among their peers; and
- 69% are sure that car sharing and carpooling should be more common that car owning.

4.29 The Department for Transport (DfT) also report that young people have become ‘accustomed to a lifestyle in which private car use is less central than it has been for previous generations’, and that ‘it is possible that the changes in young people’s travel behaviour described above are the first phase of a social change that will continue through successive generations’.

4.30 Car ownership no longer defines status or aspirations. With the rise in working from home or a Third-Place, fewer people are likely to see a future living in dormitory (or sleeper) settlements and commuting to a single place of work. This has led to a marked decrease in car ownership among the younger generation over the past 25 years.

Electric Vehicles

4.31 The UK has announced that from 2035, new petrol and diesel car and van purchases will be banned in lieu of electric, or hydrogen powered vehicles. The same will happen for HGVs from 2040.

4.32 Electric vehicles (EV) or battery electric vehicles (BEV) are already on the rise, with an increasing proportion of car purchases per year being electric (BEV, battery electric vehicle) or hybrid (PHEV, plug-in hybrid electric vehicle). In Q3 of 2023, 15.4% of all newly registered cars in the UK during this quarter were EVs (Department for Transport statistics, Tables veh0132 and veh0105). The current trends towards EVs will only accelerate as the UK attempts to phase-out combustion engine vehicles by 2035.

4.33 The South Gloucestershire publication Electric Vehicle Charging Strategy (March 2023) states that South Gloucestershire has seen significant growth in EV sales over the past six years and this has been reflected in the uptake of EV charge point grants as shown in **Figure 4.5**.

Figure 4.5: South Gloucestershire EV Charging Points Installed

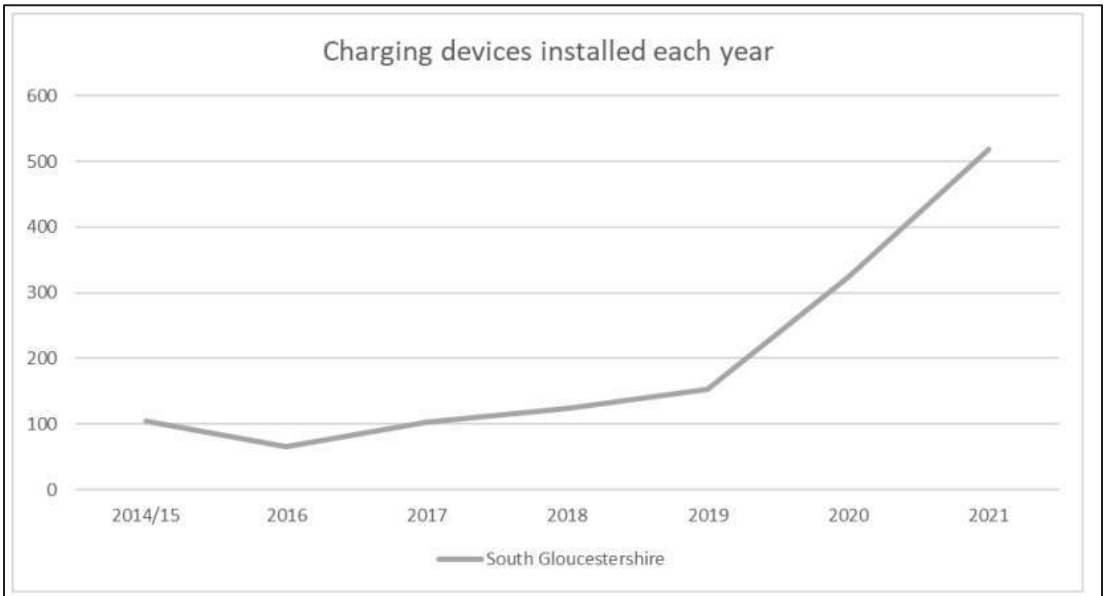


Figure 2: EVHS uptake in South Gloucestershire

4.34 SGC Council are forecasting[8] that 29.4% of total vehicles in South Gloucestershire will be EVs by 2030.

[8] South Gloucestershire Electric Vehicle (EV Charging Strategy) 2023

4.35 EVs form a large part of the Decarbonising Transport strategy set out by the UK Government, and infrastructure to support use of EVs is being developed quickly across the UK. Development at Woodlands will support this policy aspiration and trend by providing EV charging capabilities for every home in line with Building Regulation guidance, as well as at workplaces and public parking areas. Parking strategies such as communal residential parking hubs will be considered to reduce the dominance of the car in the placemaking of streets and home fronts.

4.36 Hydrogen uses are also a consideration and will be factored into the aspirations for Woodlands.

Summary

4.37 This section summarises the direction in which attitudes to travel and mobility are heading, and the changes already being seen in the UK. National transport policy is moving away from ‘predict and provide’ to a ‘vision and validate’ approach which encompasses a holistic multimodal approach, supporting access to development by walking, cycling and public transport in the first instance.

4.38 Travel trends are changing with a growing greater interest on getting mobility via a smart phone over owning a car. Liveability is at the forefront of minds particularly following the Covid-19 pandemic, where health and wellbeing are acknowledged to be of the upmost importance. Placemaking plays a role in delivering a place to live and work that achieves these goals, which play hand-in-hand with the climate aspirations of the UK.

4.39 These trends are inescapable and, in application to Woodlands, can be grasped from the very outset of development given its accessible location that offers, in particular, access to a large number of employment opportunities via public transport, walking or cycling. Woodlands has the opportunity to develop a truly liveable community in this part of South Gloucestershire, which encourages a shift away from reliance on less sustainable modes of transport.



5.0 Vision and Validate Approach

Introduction to Vision and Validate

5.1 The vision and validate approach at Woodlands Garden Community will embrace a place-based solution with provision of services and facilities that communities need in a 15-minute neighbourhood, thereby minimising the need for individual travel.

5.2 The Mobility Strategy supports the vision by following the SAM (Sustainable Accessibility and Mobility) Framework (RTPI, Net Zero Transport: the role of spatial planning and place-based solution. January 2021)

5.3 The first stage is substitution of trips, this is minimising travel demand by applying 15-minute neighbourhood principles to site design. Shifting modes is making active and shared mobility the natural choice over the private car, with MaaS (mobility as a service) enabled transport options. Finally, switching fuels refers to minimising the most polluting fuels. Futureproofing of proposals to provide charging infrastructure is crucial.

The Access Hierarchy

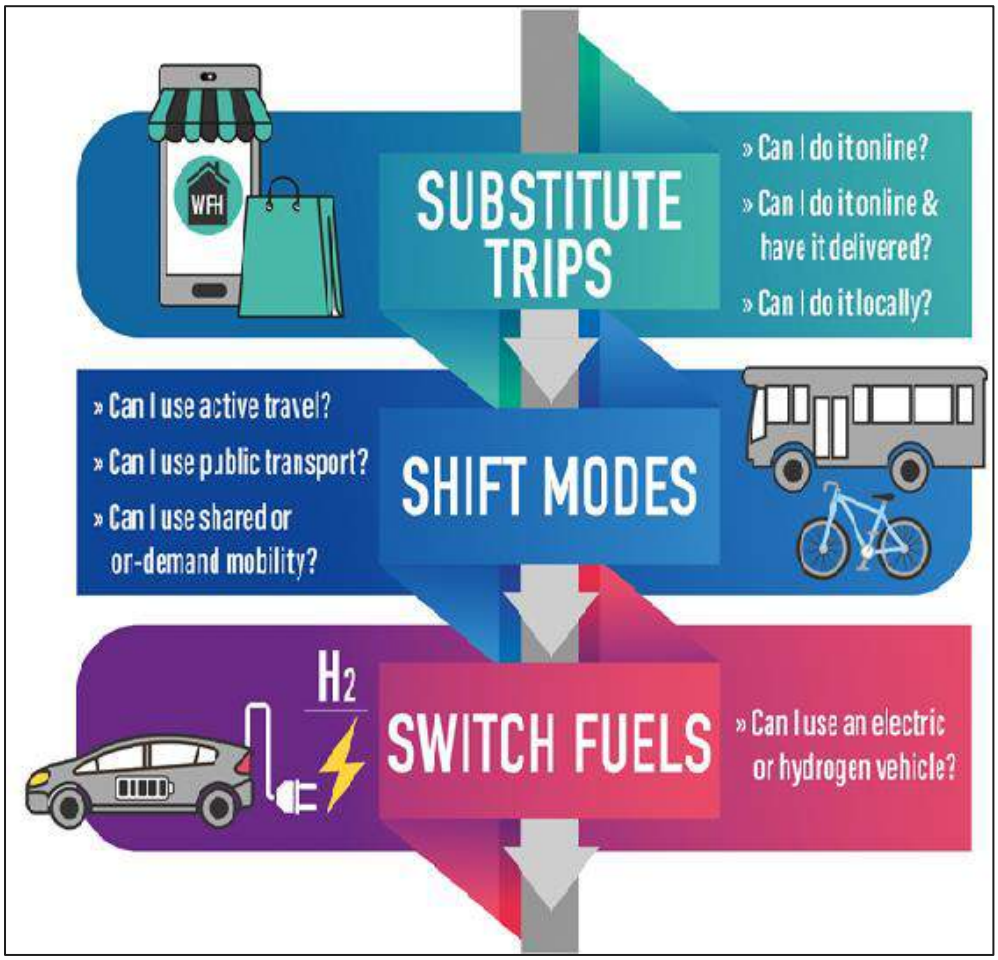
5.4 The latest thinking in transport planning terms considers travel as the third and fourth question to ask with regards to gaining access to services and facilities, with alternative options considered before that. Traditionally, when an individual wants to gain access to services or facilities, they would have needed to travel to visit the shop/facility in person. However, over time, and due to technological advances, this has changed and accessing services and facilities in modern life is different and, in many instances, adopts the following approach:

- Can I do it online?
- Can I do it online and get it delivered?
- Can I travel locally (i.e., "active" (such as walking or cycling) travel)? and, finally
- I need to travel further so what is the most sustainable method?

5.5 Only once all of these questions have been answered, would people consider the use of the private car. As a consequence of the COVID pandemic there has been a shift to home working and virtual mobility which also reduced the overall need to travel, and this trend will need to be accommodated with new modern development which focuses on placemaking.

5.6 The overall all approach is shown in **Figure 5.1**.

Figure 5.1: Access Hierarchy



5.7 This approach is consistent with the South Gloucestershire transport hierarchy[9]. The hierarchy is shown in **Figure 5.2**.

[9] South Gloucestershire Electric Vehicle (EV Charging Strategy) 2023

Figure 5.2: SGC Transport Hierarchy

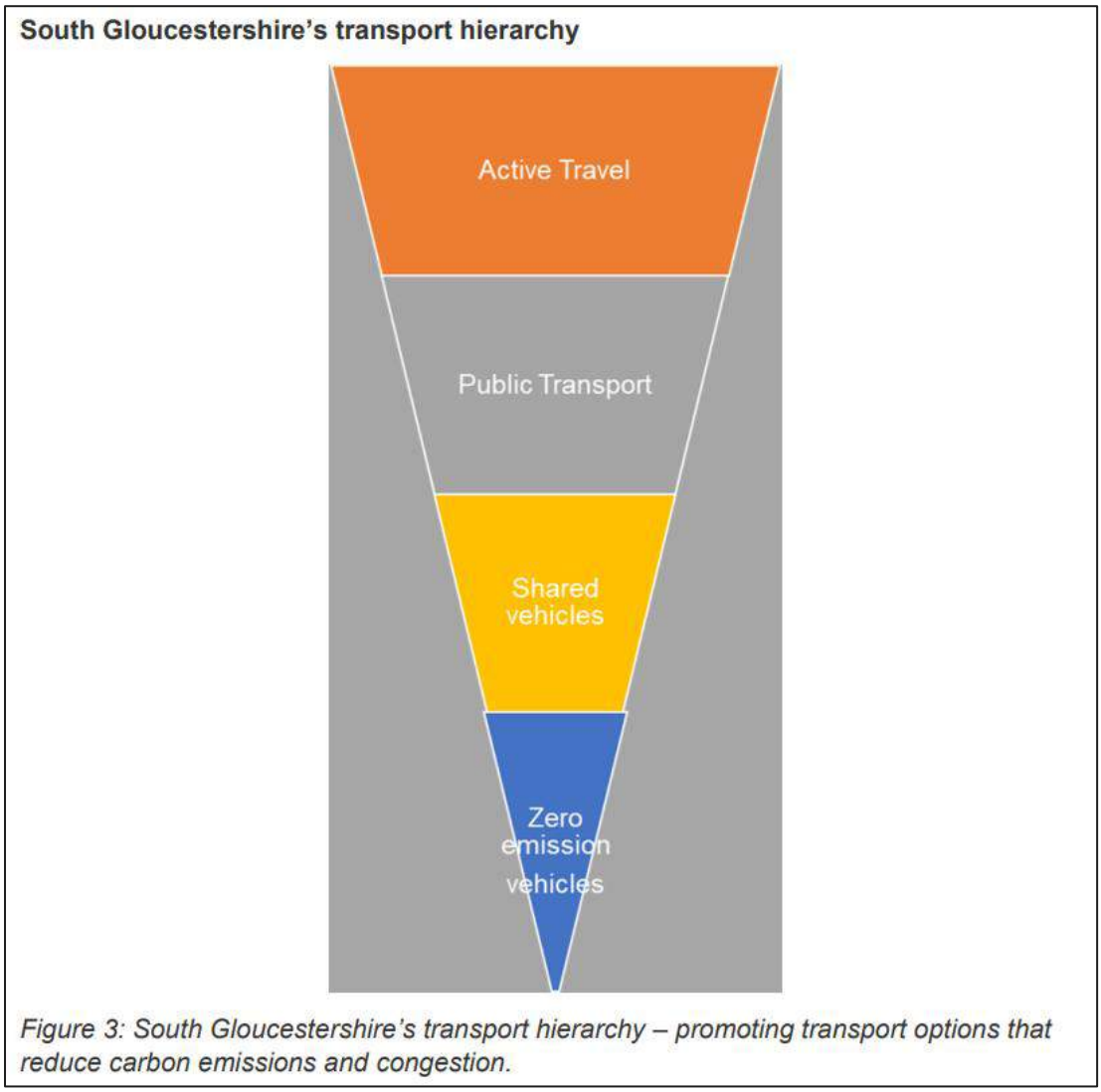


Figure 3: South Gloucestershire's transport hierarchy – promoting transport options that reduce carbon emissions and congestion.

5.8 The vision[10] set by South Gloucestershire is:

"The overall transport vision for South Gloucestershire is to prioritise sustainable transport options. There are numerous benefits to individuals, places, and the environment more widely. As such, we are committed to reducing car use overall across the district in favour of active travel and public transport options. When trips need to be made by private vehicle, we want them to be made by EV".

[10] South Gloucestershire Electric Vehicle (EV Charging Strategy) 2023

Substitute Trips

Virtual Mobility

Super Fibre Broadband

5.9 It is proposed that each property at Woodlands will benefit from full fibre internet to maximise connectivity and to encourage the avoidance of trips by enabling servicing to be accessed directly from home.

Covid-19 as a Catalyst

5.10 The way we live and the value we place on time has been accelerated as technology advances. We now pursue day to day activities in the 'physical' sense where the concept of using technology to bridge the digital world with the physical world we live in is more convenient. This includes mobility as well as online shopping, socialising, and work.

5.11 The latest Deloitte research has shown that these trends which accelerated during the Covid-19 lockdowns has plateaued, but remains at an all-time high.

Working from Home/Third Place

5.12 During the first (and subsequent) Covid-19 lockdown in the UK, every worker who had the ability to work from home did so. Working from home has now become an acceptable way of working for many employers, and the benefits are now apparent.

5.13 The concept of a 'third place' within the site becomes significant in the context of a 15-minute town. Facilities will exist within the site and provide a middle ground between 'home' and 'work'. These 'third places' can provide a boost to the local economy, capturing business during the day where people may otherwise be at their place of work and where they might seek a change from the home working environment. This helps to create vibrant communities by bringing neighbours together. The rise of remote working, stimulated greatly by the Covid-19 pandemic, creates an opportunity for a market town renaissance whereby residents can live, work, and spend within the settlement, regardless of the location of their employment.

5.14 SLR Consulting (previously Vectos) has created a tool to determine the increase in WFH proportions for each Local Authority District Area across the UK based on ONS data. The data demonstrates that in 2019, in urban cities and towns within South Gloucestershire, 13.6% of all working residents were working from home at least 1 day a week. As of December 2023, this figure had increased to 27.8%. This equates to an increase in the WFH population of 104% over the space of four years. It is estimated that at this level of WFH, for every 100 residents aged between 16-74, 6,842 car trips are avoided per year. On the scale



of the proposed development there is the potential for a considerable number of trips to be avoided by enabling future residents to WFH effectively.

5.15 The local living aspect of the site will provide a higher containment of trips, with longer distance private car journeys being replaced by sustainable travel patterns within the local area. Therefore, it is not anticipated that there will be any greater burden upon the surrounding transport networks.

5.16 The development will also provide facilities to operate as a third place of work such as coffee shops and co-working space.

Can I do it online and get it delivered

Micro-consolidation

5.17 It is proposed that each property will benefit from full fibre internet to maximise connectivity and to encourage the avoidance of trips by enabling servicing to be accessed directly from home.

5.18 Measures such as Amazon lockers could be provided at the mobility hub or local retail.

5.19 The key advantage would be to reduce the amount of vehicle trips within Woodlands Garden Community itself, creating a more attractive environment for pedestrians and cyclists. i.e., one delivery vehicle can drop off parcels for all site addresses within a single location (rather than delivering directly to each individual property) and then those parcels are distributed out within the site by sustainable modes such as cargo bikes.

Can I do it locally - On-site Facilities and Containment

Local Living

5.20 Local living or 'liveability' is at the forefront of people's minds right now and 15-minute neighbourhoods are based upon a design ethos of creating complete, compact, and connected neighbourhoods where people can meet their everyday needs within a short walk or cycle.

5.21 This is not a new concept and historically many towns and cities have evolved around a model similar to a 15-minute neighbourhood. The emergence of these walkable places to live has grown around the world, and the need for them has only been quickened by the Covid-19 pandemic which has put a spotlight on the importance of the liveability of where we live.

5.22 This idea presents multiple benefits including boosting local economies, improving people's health and wellbeing, increasing social connections in communities, and tackling the climate change emergency.



5.23 In taking advantage of two key attributes, size and location, the site at Woodlands Garden Community paves the way for numerous measures and strategies to encourage local living and support the initiative of 15-minute neighbourhoods.

5.24 The new community will be developed in the context of local living, delivering a design that maximises the attractiveness of active travel as well as the provision of complementary land uses on site **Figure 5.3** illustrates how containment might work.

Figure 5.3: Local Living (15 Minute Neighbourhood Approach)



5.25 The fully permeable layout of Woodlands will typically be dominated by an active travel network at a local level with a full and priority network for cycling. On site facilities will be provided which include:

- community facilities, a primary mobility hub (as described further below), primary education, a local centre which enables future residents to live locally and reduce the need to travel off site; and

- parcel lockers adjoining the mobility hub for on-line deliveries to be dropped off and collected at convenient times enabling future residents to collect items locally.

Shift Modes

Mobility Hub

5.26 A primary mobility hub will be at the heart of the development with supplementary hubs interspersed. This forms a focal central point for people to meet, interact, work, and spend time. The Mobility Hub could also provide a range of facilities, being co located adjacent to the local centre.

5.27 The Mobility Hub would be highly accessible by active and public transport modes, offering safe and secure cycle parking, as well as potentially a bike repair shop. Car club and carpooling spaces would be made available, as well as EV charging points and a comfortable bus stop. It might include a small café, all seeking to make this a central place to encourage community interaction and naturally promote sustainable transport choices.

5.28 Car free, or low car, neighbourhoods, where the primary network is the active travel network lend themselves to a network of Mobility Hubs either Primary, Secondary or Tertiary could be incorporated into the design.

5.29 Primary Mobility Hubs will be located in local centre with the potential for smaller secondary or tertiary hubs also located within the development.

5.30 **Figure 5.4** shows what the primary mobility hub within the site might look like.

Figure 5.4: Primary Mobility Hub Illustration



5.31 The primary mobility hub could include a mix of uses such as:

- High-quality bicycle parking
- Bicycle repair stations;
- Bike and e-bike share;
- Connected active travel routes;
- Cargo bike share;
- EV car club;
- DRT pick-up/drop-off bays;
- EV charging points;
- Secure parcel lockers;
- High speed free Wi-Fi;
- Real time travel information;
- Wayfinding totem signage for onward active travel journeys;
- Proximity to public transport stop;
- Appropriate safety infrastructure such as lighting;

- Shower facilities;
- Community concierge features include;
- Micro-consolidation centre for parcel receipt, including onward last-mile delivery by cargo bike or ground drone for example;
- Third place working hub;
- Café and community meeting space;
- Travel Planning servicing including for schools;
- Coordination of local walks and cycles; and
- Management of IT platforms for car sharing and DRT.

Active Travel

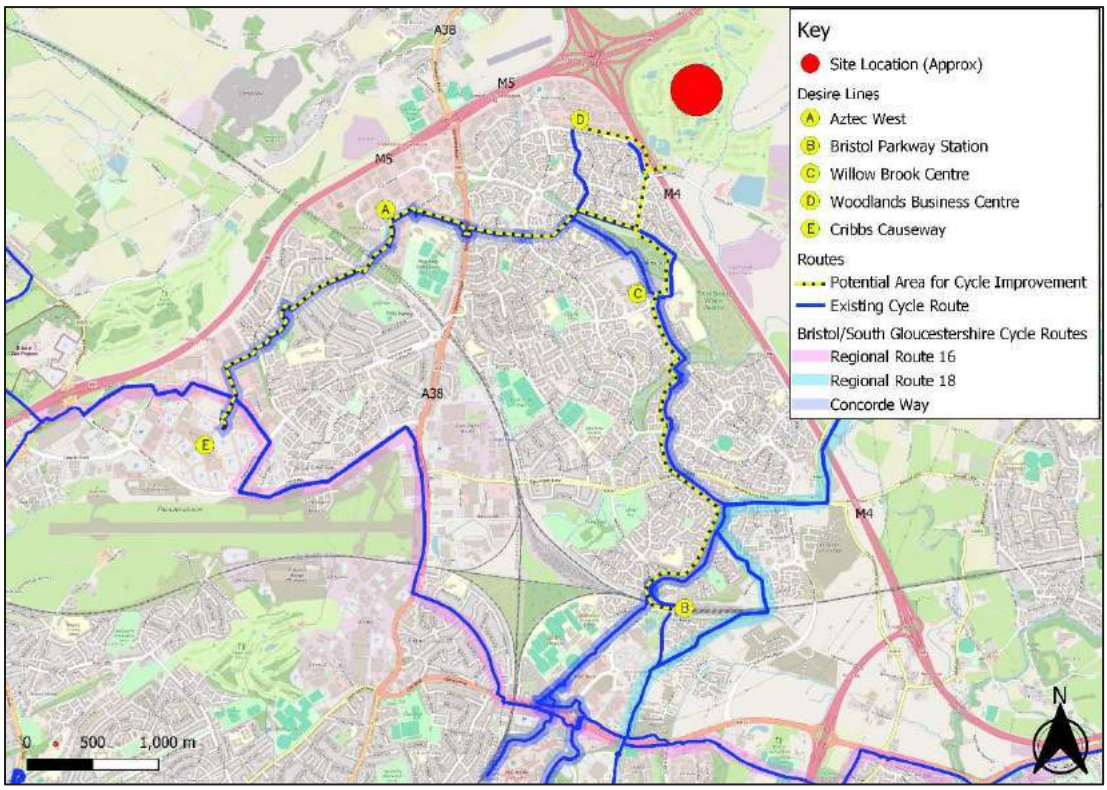
5.32 Active travel provision will start at the local level with a network of greenways which prioritise active travel and e-mobility (including electric bikes and scooters) enabling future residents to travel around the site and further afield by means other than the car.

5.33 The active travel strategy, which is to be investigated in combination with SGC is likely to include:

- Creation of an Active Travel Link between the site and Concorde Way Cycle Route
- Review and improve Active travel links to Aztec West and Woodlands Business Park;
- Review and improve Active travel links to Parkway Rail Station, Willowbrook Retail Park and Bradley Stoke Leisure Centre; and
- Review and improve Active travel links to Cribbs Causeway and Bristol City Centre.

5.34 A plan showing these routes are shown in **Figure 5.5.**

Figure 5.5: Active Travel Strategy



Public Transport

5.35 The development will provide investment into public transport provision, details of which are to be discussed with the highway authority.

5.36 There is currently a good level of service within close vicinity of the site, with the 73-service operating every 30 minutes within 350m walk of the site access from Trench Lane and Woodlands Lane. Additionally, the T1 service which operates every 20 minutes can be reached within a 1200m walk from the site access from Bradley Stoke Leisure Centre. Discussions are ongoing with First Bus Bristol, Bath & The West regarding potential extensions or diversions of these routes for services to route through the site.

5.37 The intention will be for all residents to be able to access a regular bus service within 400m from their individual property.

5.38 The provision of regular services accessible within a short distance of residents will encourage travel by public transport to key locations, such as Bristol city centre which is served by both the 73 and T1 service.

5.39 We have engaged with Frist Bus who have suggested that there is potential scope for the T1 bus service to be routed through the site. Frist Bus suggested that if funding is made available for an extra bus, then the T1 could operate on 30-minute frequency between Thornbury and Bristol City Centre via Almondsbury (as per the existing route) and a 30-minute frequency between Thornbury and Bristol City Centre via Woodlands. This is subject to further assessment.

5.40 **Figure 5.6** provides a summary for the existing route.

Figure 5.6: Existing Bus Route (T1)



5.41 **Figure 5.7** provides a summary of the potential future route

Figure 5.7: Potential Bus Service Arrangement (T1 Altered Frequency & New Route)



Car Club

5.42 A Car Club will be provided at the Primary Mobility Hub. A car club is where several people access and drive the same vehicle. For example, several people in the same community would drive the car on different days of the week utilising a booking service.

5.43 This means that drivers have access to cars without the need to own them. Access without ownership is becoming more common in modern-day living as it takes away the pressure and cost of having to maintain a vehicle. It also provides scope for residents to make use of external spaces or garages on their property in other ways, without having the need to accommodate a vehicle.

5.44 Studies have demonstrated that each shared car replaces between eight and eleven private cars. Car clubs are becoming more prominent in towns and cities across the UK, and car club spaces can be located strategically at key destinations, major employment sites, transport hubs, and town and city centres. The membership of car clubs is increasing, reflecting people's changing attitudes towards Mobility.

5.45 The provision of a car club will encourage residents to adopt more sustainable travel habits with the knowledge that should an emergency arise, or there be a need to travel quickly, run

an errand, collect a parcel, or vary a journey in another way, there is a flexible option which can be used as required on-demand.

5.46 Enterprise Car Club operates 2,000 vehicles nationally and has expanded to 30 new locations in the past 3 months. Research undertaken by Enterprise Car Club indicate that in the last 12 months each car club replaces 10.5 vehicles from the road. Enterprise Car Club has almost eliminated diesel vehicles from their fleet and 18% of the fleet in London is now electric or hybrid electric.

Switch Fuel

5.47 The development proposal could include an EV charging station. This will provide space for residents and customers to park their cars. It also provides the opportunity for people to park at the EV charging station and use the park and ride services, or to cycle to their destination using some of the new cycle route proposed.

5.48 Additionally, in line with Building Regulations Approved Document S, the development will provide each residential dwelling with an EV charging point from the outset.

Summary

5.49 The proposal would provide an exemplar highly accessible and sustainable development ensuring that residents can gain access to services and facilities within the site itself or by excellent sustainable transport choices.

6.0 Access Strategy

6.1 This section of the report set out the access strategy for the development.

Vehicle Access

6.2 The proposals for vehicle access remain unchanged from that set out within the 2018 Transport Study. The proposals are replicated below.

6.3 The proposed scheme includes access points directly from Trench Lane and Hortham Lane. There is also the potential to connect these two accesses through a development spine road. The design of the spine road would be in line with the requirements of Manual for Streets and will take into account the principles of placemaking and a street for all rather than an emphasis on the private car.

6.4 The spine road is likely to be designed as follows:

- 6.5m carriageway;
- 2m footway on one side of the road;
- 3m / 4m shared cycle way on one side of the road; and
- Access Road to be designed on the basis of MfS principles.

Southern Access

6.5 It was proposed that the southern access to the site would be gained directly from Trench Lane via a new three-arm roundabout. This would form the primary access to the site. The design of the proposed main access is shown in **Drawing 162451_PHL_06** contained at **Appendix B**. A detailed capacity assessment of the site access was undertaken as part of the 2018 Transport Study and showed that this form of junction operates well within capacity, even with all development traffic routing through it (assuming no link road or northern access junction). Details of the modelling work are re-provided at **Section 6** of this report.

Northern Access

6.6 It is proposed that a northern access is provided from Hortham Lane to the north. This will take the form of a T-Junction arrangement as shown in **Drawing 162451_PHL_05** contained within **Appendix B**. Observed traffic flows along Hortham Lane are low and we do not anticipate any capacity issues.

Active Travel Access

6.7 It is proposed that a new bridge over the M4 parallel to Trench Lane bridge is provided which would create a new dedicated link for cyclist and pedestrians and which would provide a direct connection into the site.

6.8 An indicative scheme layout of the bridge is provided in **Drawing 162451-GA-01** contained within **Appendix B**.

6.9 This would not be accessible for vehicles and therefore would provide a segregated and direct pedestrian and cycle link between the site and Woodlands Lane.

Off-Site Active Travel

6.10 Active travel provision will start at the local level with a network of greenways which prioritise active travel and e-mobility (including electric bikes and scooters) enabling future residents to travel around the site and further afield by means other than the car.

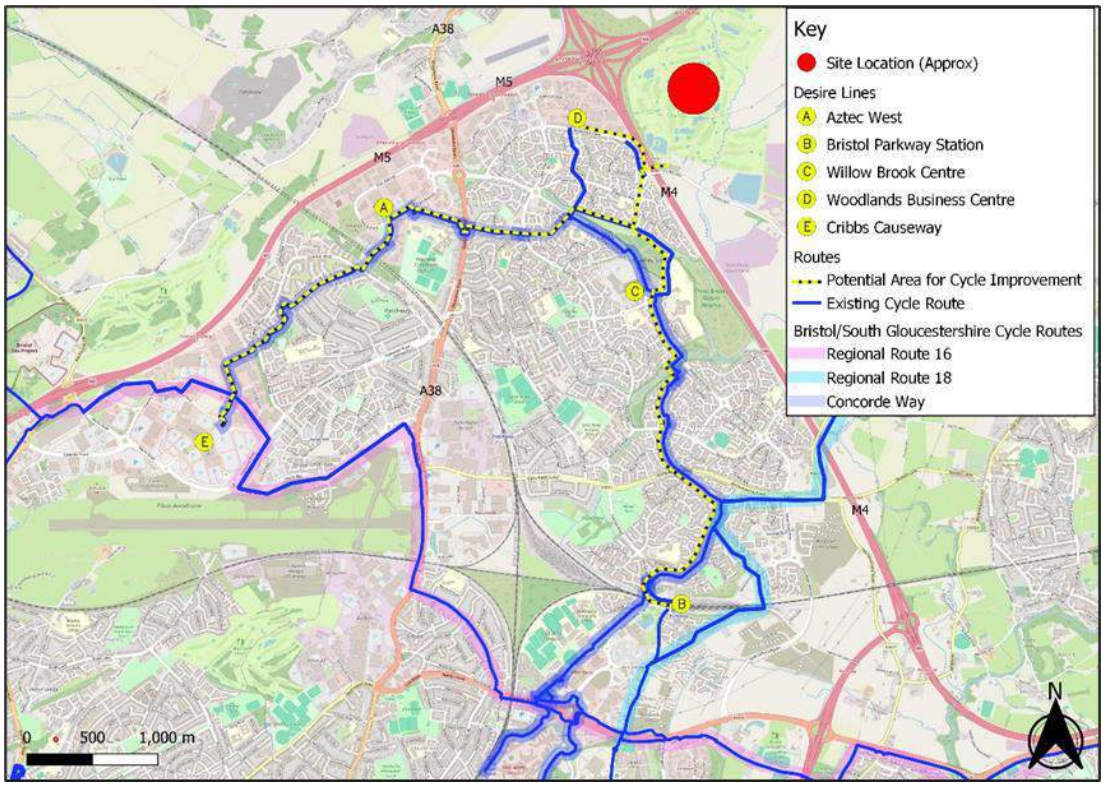
6.11 The active travel strategy, which is to be investigated in combination with SGC includes improvements to:

- Creation of an Active Travel Link between the site and Concorde Way Cycle Route
- Review and improve Active travel links to Aztec West and Woodlands Business Park;
- Review and improve Active travel links to Parkway Rail Station, Willowbrook Retail Park and Bradley Stoke Leisure Centre; and
- Review and improve Active travel links to Cribbs Causeway and Bristol City Centre.

6.12 A plan showing these routes are shown in **Figure 6.1.**

6.13 Enhancement to these routes would not only benefit those residing within the development, but would also provide wider benefits to existing residents and employees in North Bristol.

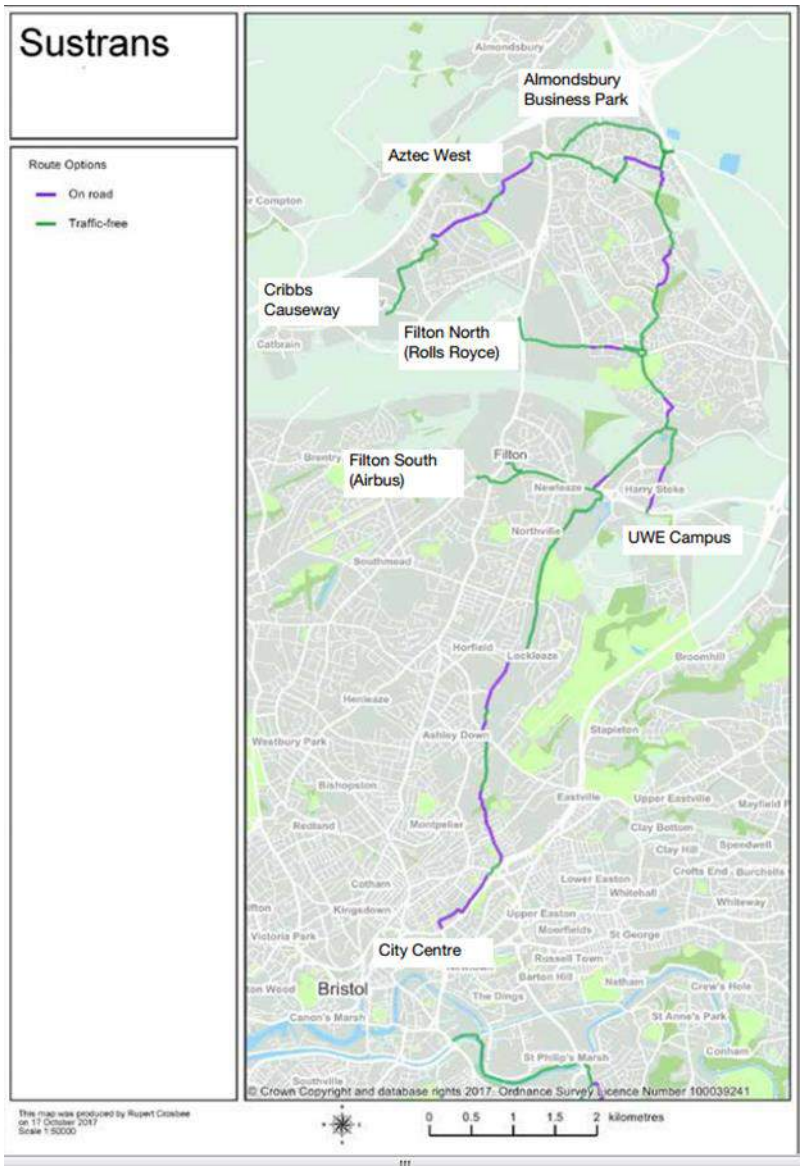
Figure 6.1: Active Travel Strategy



6.14 As part of the 2018 Transport Study, SUSTRANS were instructed to develop a network of active travel routes servicing the development site which would focus on creating High-Capacity Transport Network (HCTN) between the site and major trip destinations.

6.15 The proposed strategy as per the 2018 Transport Study is set out in **Figure 6.2**. However, SGC has confirmed that the active travel strategy for the Local Plan will need to be developed in conjunction with themselves. Notwithstanding this, the 2018 SUSTRANS work provides a good basis to start from and key parts of the identified improvement works could still form part of the mitigation package for Woodlands if considered necessary.

Figure 6.2: SUSTRANS Proposed Improvement Strategy



7.0 Trip Generation and Assessment

2018 Transport Study

7.1 This section provides a high-level summary of the analysis work undertaken in 2018 as part of the promotion of the site for the Joint Spatial Plan. A comprehensive update of this work will be produced to support a planning application.

7.2 A Transport Assessment scoping report has been issued to SGC and the scope of the modelling assessment work and trip generation are currently being developed and agreed with SGC.

Trip Generation

7.3 The 2018 Transport Study considered that transport impact of a development comprising 2,000 dwellings, a 2 Form Entry Primary School, Retail Provision and Local Centre and Care Home.

7.4 **Table 7.1** provides a summary of the traffic forecast that was used to assess the impact of the 2018 scheme.

Table 7.1 – 2018 Trip Generation

Development Traffic			
Period	**In**	**Out**	**Total**
0700 to 0800	106	395	500
0800 to 0900	166	567	733
0900 to 1000	216	270	486
1600 to 1700	440	245	685
1700 to 1800	544	312	856
1800 to 1900	382	265	647

7.5 Whilst the traffic forecast as set out in **Table 7.1** includes assumptions relating to trip containment, it does not account for netting of the traffic forecast associated with the extant use of the site or any reduction to account for the implementation of Travel Plan measures. As such the analysis work provided a robust basis for assessment.

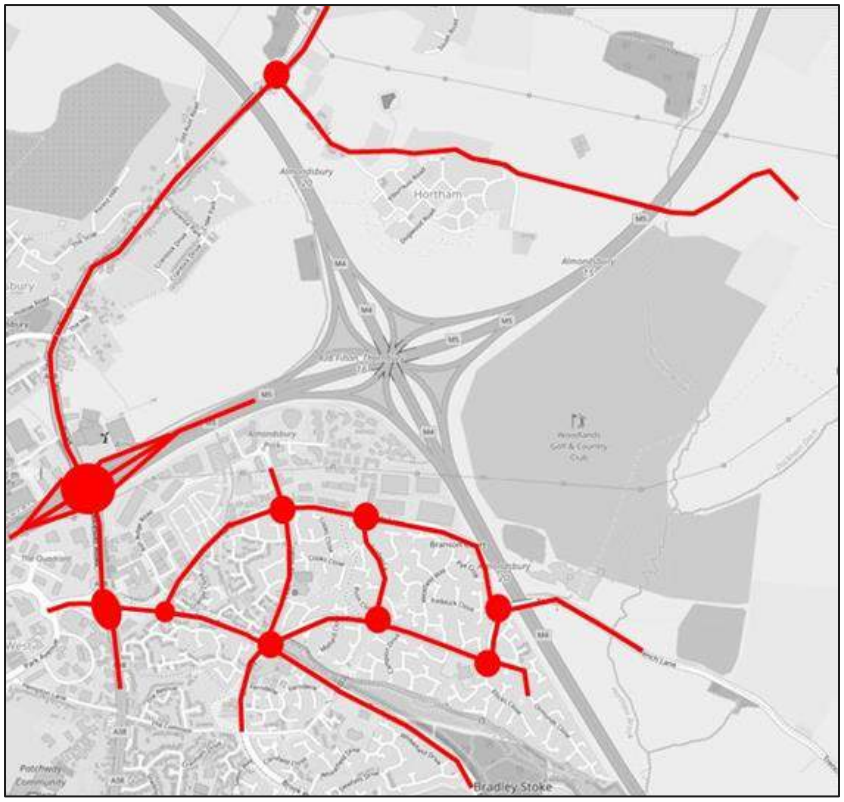
7.6 The traffic forecast associated with Local Plan ambition of delivering 1,175 dwellings within the plan period, a primary school, and local centre in the plan period would be considerably lower.

7.7 The approach that should be undertaken for any updated assessment work will focus person trips and the hierarchy of modes of travel as set out earlier within this document.

Extent of Modelling

7.8 The assessment in the 2018 study was based on VISSIM model as per the network shown in **Figure 7.1**.

Figure 7.1: 2018 VISSIM Model Network



Assessment Scenarios

7.9 The VISSIM model considered the impact of the development for the AM and PM peak periods for 2017 (survey year) and a forecast year of 2036.

7.10 A set of robust growth factors were applied to the 2017 base flows to forecast 2036 flows which equated to a 15% increase in baseline traffic data. This should be considered in the context of the trends set out within **Section 3** of this report which shows that there has been no growth on the network since the collection of data in 2016.

7.11 As such, the capacity assessment work undertaken as part of the previous assessment continues to provide a robust assessment of the network following the development proposals.

7.12 A scoping document has been issued to SGC highways to agree the scope of the updated assessment.

Site Access Capacity

7.13 There are no capacity issues at the site accesses.

Wider Network Impacts

7.14 The assessment included two development scenarios; one which included an access onto Trench Lane only (no spine road); and another which included an access onto Trench Lane and Hortham Lane (with spine road).

7.15 The assessment contained within the 2018 Transport Study considered queuing for these scenarios reported within the VISSIM model at the following junctions:

- M5/A38 Junction 16;
- Aztec West Roundabout (A38/Bradley Stoke Way);
- Woodlands Lane/Bradley Stoke Way;
- Pear Tree Road/Bradley Stoke Way; and
- A38/Hortham Lane.

7.16 The study concluded that the impacts of the Woodlands development would result in minimal increases in queuing at all junctions with the exception of the M5/A38 Junction 16. This junction was forecast to increase queues by up to 32 vehicles on any arm in the PM peak hour. The impact in the AM peak hour was negligible.

7.17 The Transport Study concluded that a cumulative scheme for a junction improvement at M5/A38 Junction 16 would be proposed and the Woodlands scheme would provide a contribution towards such a scheme.

7.18 The 2018 Transport Study also considered network delay. This considered delay across the entire VISSIM network, which covered a significant area as presented in **Figure 7.1**. The assessment found that with the delivery of the Woodlands scheme (with spine road), there would be a network delay increase of 16 seconds in the AM peak hour, and 51 seconds in the PM peak hour. This level of delay was not considered to be severe in the context of the delivery of 2,000 dwellings and that this additional delay would be experienced across the whole network, not just at individual links or junctions. It is also noted that the assessment considers a robust test of the development proposals, as set out previously within this Chapter.

7.19 Notwithstanding the above, development proposal for the plan period is 1,175 dwellings which is considerably lower than the dwelling number (2,000) that the 2018 Transport Study



assessment was based on. Equally, the 2018 assessment included robust growth factors and it has since been shown that there has been no growth on the road network. As such the 2018 model is likely to have overestimated network traffic flows and development traffic flows and overall, the network is likely to operate better than what was reported in the 2018 Study.

7.20 An updated assessment methodology is currently being agreed with SGC highways, which takes the form of the vision and validate approach.

8.0 Local Plan Stage 1 Modelling Outputs Reports

Introduction

8.1 The Stage 1 Modelling Outputs Report was published by SGC in January 2024, and forms an evidence base for the New Local Plan. The report presents the inputs considered for the development lenses and the respective model outcomes, the report is based on the West of England Regional Transport Model (WERTM) suite consisting of Highway Assignment Model (HAM), Public Transport Assignment Model (PTAM) and Variable Demand Model (VDM) components to develop forecast year model scenarios for 2042 with SGC's Local Plan development changes.

8.2 Three Do Something (DS) lenses have been tested at this stage and the impacts on the transport network, measured against the Do Minimum (DM) scenario. These are described below:

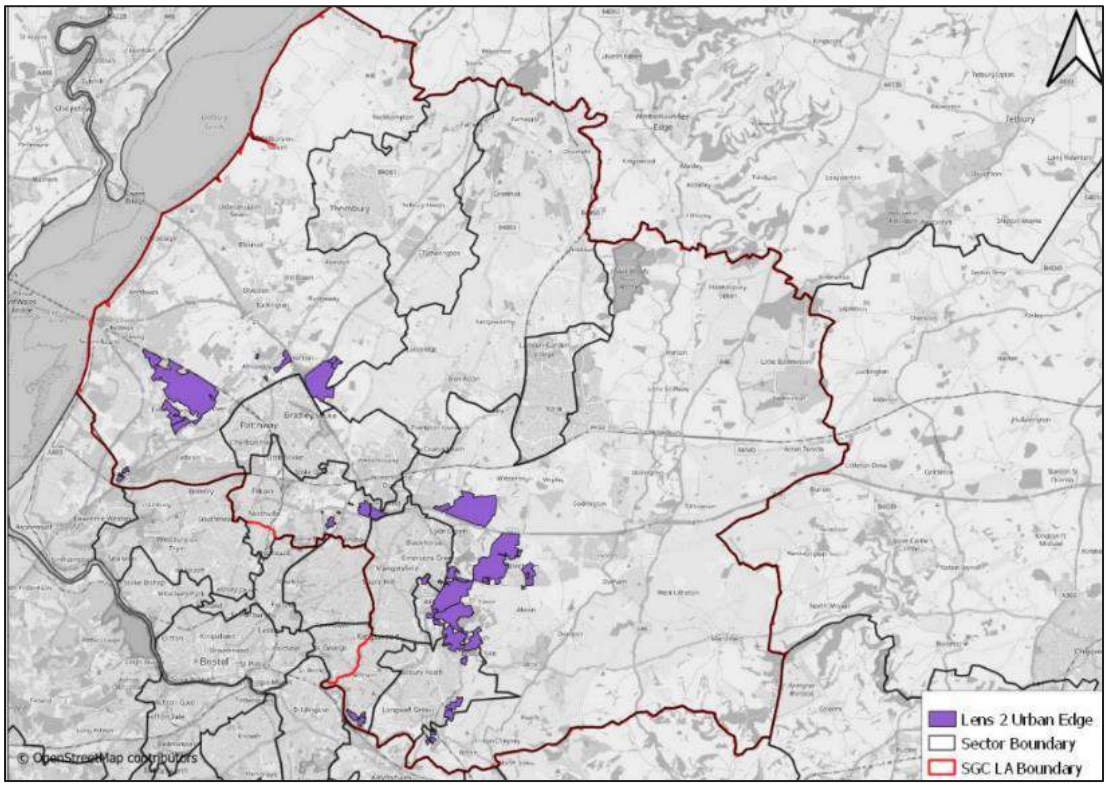
- **2042 Do Minimum**: this is the 2042 scenario with no Local Plan, but includes committed development and transport schemes which are assumed to have been completed by 2042;
- **2042 Do Something (Lens 1)** – Local Plan with no Green Belt Loss;
- **2042 Do Something (Lens 2)** – Local Plan Urban Edge; and
- **2042 Do Something (Lens 3)** – Majority of new homes provided along already established key public transport routes and hubs.

8.3 The relevant scenario for Woodlands Garden Community is the Lens 2 assessment which differs from the Preferred Strategy.

Lens 2 Development

8.4 **Figure 8.1** shows the location of the Lens 2 sites.

Figure 8.1: Lens 2 Sites



8.5 **Figure 8.2** provides a summary of the Housing and Job Numbers in Lens 2, which has been taken directly from the Local Plan Stage 1 Transport Report.

Figure 8.2: Lens 2 Development Assumptions

Sector	Dwellings	Jobs	% of Dwellings	% of Jobs
Kingswood	333	138	2.5%	1.0%
Pilning, Severn Beach and Woodhouse Down	3,747	2,956	28.5%	22.2%
Filton, Bristol Parkway & Frenchay	794	999	6.0%	7.5%
Iron Acton & Charfield	114	48	0.9%	0.4%
Pucklechurch & Chipping Sodbury	7,096	7,586	53.9%	56.9%
Mangotsfield	64	27	0.5%	0.2%
Longwell Green	1,018	1,572	7.7%	11.8%
SGC Total	**13,166**	**13,326**	**100%**	**100%**

8.6 The Lens 2 assessment comprises of 13,166 new dwellings and 13,326 new employment opportunities (jobs). The Lens 2 assessment does not account for any associated transport enhancements to mitigate the impact of the Local Plan.

8.7 It is not clear from **Figure 8.2**, where the Woodlands allocation is accounted for within the Lens 2 assumptions. SGC has confirmed that the modelling includes 1,170 homes, a primary school and local centre for the plan period. This is split between Woodlands Garden Community (875 dwellings) and the two adjacent plots (205 dwellings). The modelling assumed that there is an access onto Trench Lane and Hortham Lane, but it does not assume a link road connecting Trench Lane and Hortham Lane.

8.8 It should also be note that the Lens 2 assessment considers the cumulative impact of the schemes identified in **Figure 8.2**, rather than the Emerging Preferred Strategy. No data has been provided with regards to the impacts of the individual sites.

Traffic Impact – Network

8.9 The network impact of Lens 2 is summarised in **Table 8.1**.

Table 8.1: Lens 2 Impacts

	AM			Inter Peak			PM Peak		
	DM	Lens 2	% Change	DM	Lens 2	% Change	DM	Lens 2	% Change
Total PCU	220067	222824	1.3%	182604	184818	1.2%	219676	222465	1.3%
Total Travel Time (PCU hrs)	141630	142885	0.9%	100984	101562	0.6%	139850	141154	0.9%
Travel Distance (pcu - kms)	7894026	7917036	0.3%	6716937	6732260	0.2%	7829401	7849137	0.3%
Average Speed (km/h)	55.7	55.4	-0.5%	66.5	66.3	-0.3%	56	55.6	-0.7%
Average Delay (mins / PCU)	8.55	8.64	1.1%	3.83	3.86	0.8%	8.5	8.62	1.4%
Average Trip Length (KM)	35.87	35.53	-0.9%	36.78	36.46	-0.9%	35.64	35.28	-1.0%

8.10 There is very little impact reported on the overall network. In the AM peak there is an increase in average delay of 1.1% in the AM peak, 0.8% in the Inter Peak and 1.4% in the PM peak. This equates to on average increase in journey time of around 5 seconds in the AM peak, 2 seconds in the inter peak and 7.2 seconds in the PM peak. This level of change is minimal and would not constitute a severe impact in the context of overall network performance.

Traffic Impact – Traffic Numbers

8.11 **Figure 8.3** and **Figure 8.4** summarises the changes in traffic flows for the AM and PM peaks respectively.

Figure 8.3: Lens 2 Impact on Traffic Flows (AM)

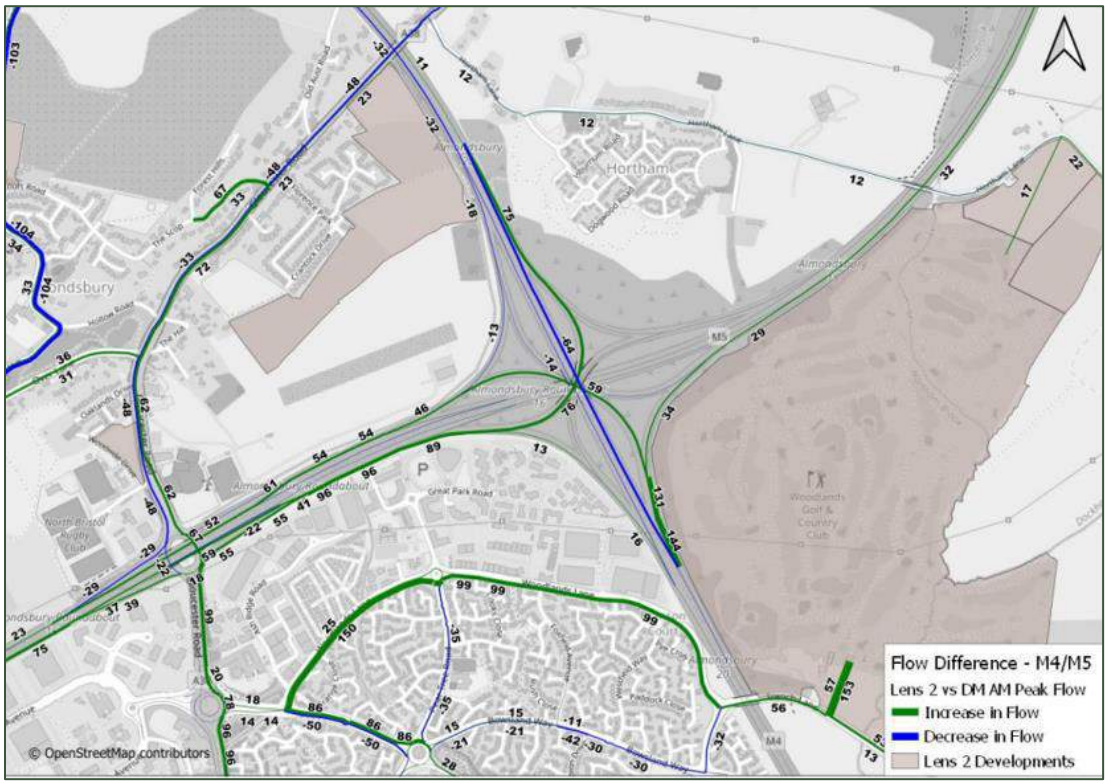
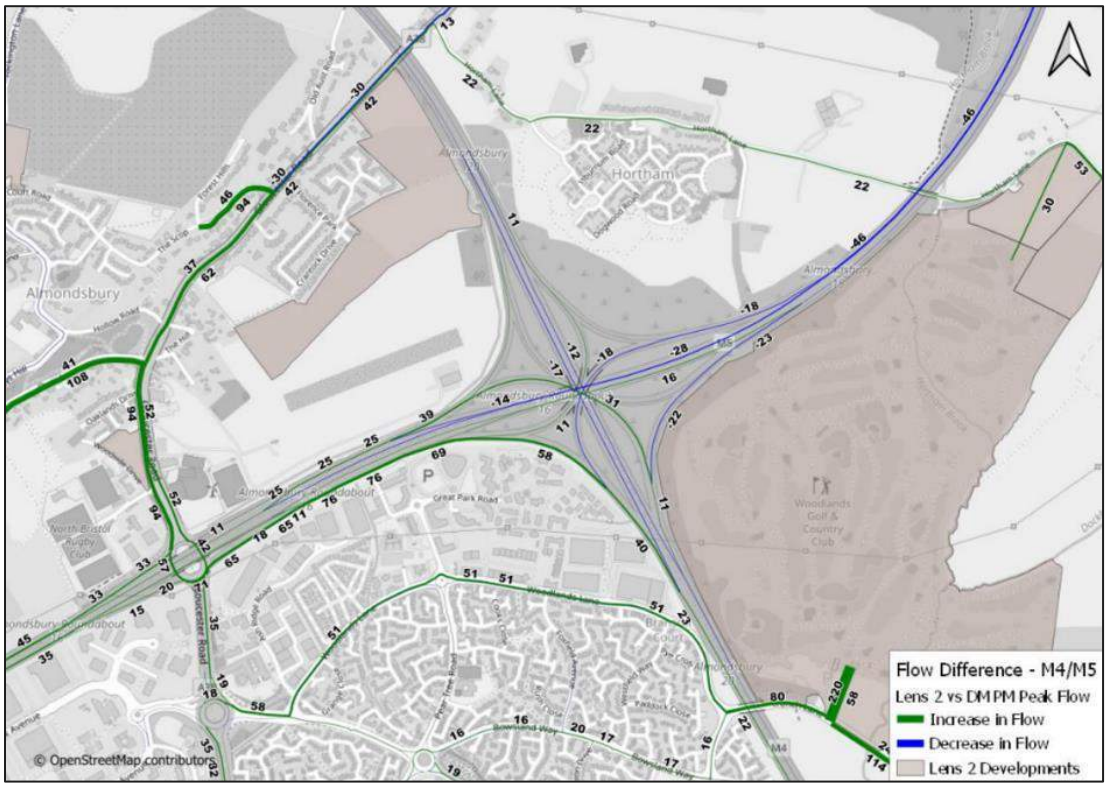


Figure 8.4: Lens 2 Impact on Traffic Flows (PM)



8.12 As shows in **Figure 8.3 and Figure 8.4**, traffic flow changes are relatively minor. The highest flow increases are on Woodlands Lane, Bradley Stoke Way and M5 junction 16.

Traffic Impact – Delay

8.13 **Figure 8.5** and **Figure 8.6** sets out the associated delay with the Lens 2 assessment.

Figure 8.5: AM Delay (Lens 2 v DM)

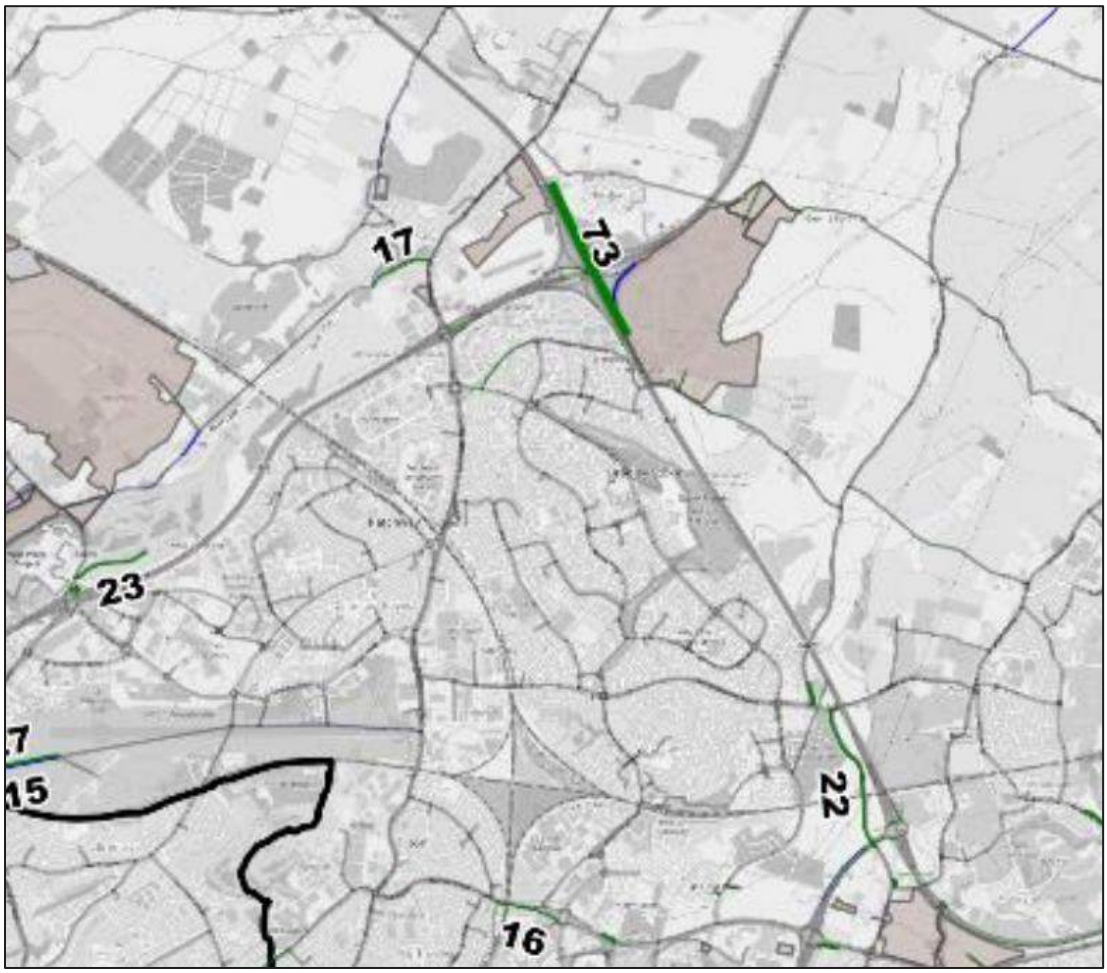
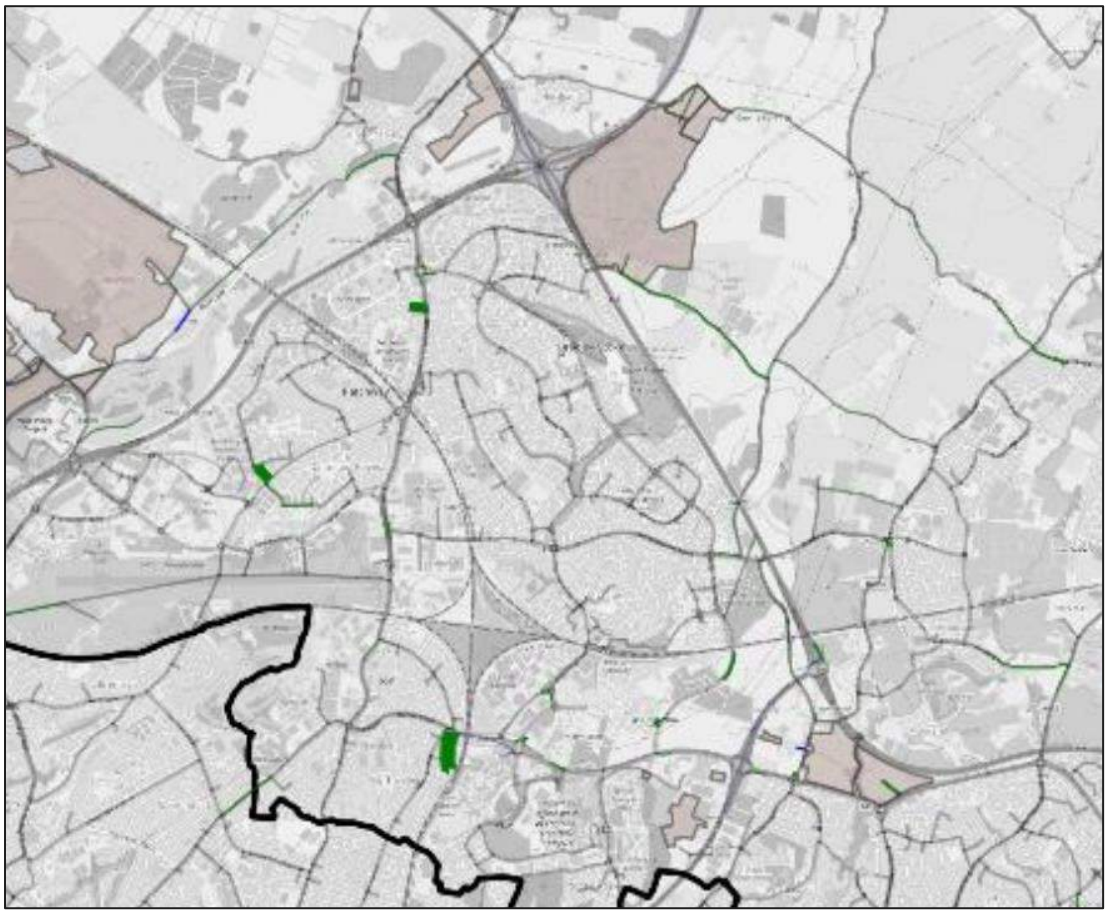


Figure 8.6: PM Delay (Lens 2 v DM)



8.14 As shown in **Figures 8.5 and 8.6,** the modelling work suggest that the impact of the Lens 2 sites has minimal impact on delay across the network, in particular on Woodlands Lane, Bradley Stoke Way and M5 Junction 16, where there the model forecasts an increase in traffic. The Preferred Strategy does not include all Lens 2 sites on the north fringe of Bristol and the potential impact of the Preferred Strategy could be even less than that reported in the Lens 2 assessment.

8.15 For the AM peak, it appears that there is an increased delay of 73 seconds at the M4 eastbound mainline however this should be further investigation as the traffic data suggest a reduction in traffic on this part of the network. No other notable changes are reported.

Bus and Rail Patronage

8.16 The model shows that there is an increase in bus patronage along the A38 however there is a reduction in bus patronage along Woodlands Lane which is the closest bus route to the development site.

8.17 We have engaged with Frist Bus who have suggested that there is potential scope for the T1 bus service to be routed through the site. Frist Bus suggested that if funding is made available for an extra bus, then the T1 could operate on 30-minute frequency between Thornbury and Bristol City Centre via Almondsbury (as per the existing route) and a 30-minute frequency between Thornbury and Bristol City Centre via Woodlands. This is subject to further assessment. Details are provided in Section 5.

Summary and Next Steps

8.18 In summary

- The modelling work presented in the Stage 1 Modelling Outputs Report was published in January 2024 generally shows that the impact of Lens 2 is relatively minor.
- There is no notable increase in delay on the local road network or at M5 Junction 16.
- The modelling does not provided details of the impact of the individual allocations. It only includes a cumulative assessment of all sites. We will engage with SGC to progress detailed modelling if the impact of Woodlands Garden Community.
- In the context of the area within close proximity to Woodlands Garden Community, there is an increase in trips along Woodlands Lane and M5 Junction 16. It is suggested that further assessment of the Woodlands site in isolation is required to understand the impact of Woodlands on the network.
- Bus patronage is forecast to reduce along the bus routes closest to the development. We have engaged with First bus show have suggested how bus provision could serve the Woodlands Garden Community.

8.19 Whilst at this stage it is unclear the extent of additional mitigations that is needed, SWSD's objective is to work collaboratively with the Council to identify a suite of transport measures that encourage and promote more walking and cycling particularly in relation to shorter and more regular local trips. Whist the exact need for improvements and appropriate mitigation measures on the wider network have yet to be addressed Woodlands Garden Community and the level of contribution required, we propose the following additional work:

- Agree detailed modelling of the Woodlands site with SGC. A scoping note has been issued to SGC;
- Discuss with SGC potential active travel enhancements between the site and key destinations including Aztec West, Cribbs Causeway and Bristol Parkway Station;
- Enhance access to the Metro Bus network, which is to be discussed with SGC, however this could include enhanced cycle parking provision at the Metro bus stops and possible improved access to scooter/e-bike schemes to enhance the link between the site and bus stop; and

- Further dialogue with First Bus with regards to enhanced bus provision for Woodlands Garden Community that includes improved level and frequency of service along with discounted travel tickets initiatives.

9.0 Summary

9.1 SLR Consulting Limited has been appointed by SWSD to provide Transport Planning advice with regards to the promotion of the Woodlands Garden Community site through the South Gloucestershire Council (SGC) new Local Plan (2040). An illustrative masterplan is provided at **Appendix A.**

9.2 The site (allocation Code: EPS-FC14) is identified within the *New Local Plan Phase 3 Towards a preferred strategy (Consultation document 2023)* for a residential development including a primary school and local centre. The Emerging Preferred Strategy suggests the site could deliver 800 homes in the plan period and a further 950 dwellings beyond the plan period.

9.3 The Lens 2 assessment shows the Woodlands Garden Community site (Site L2-FC2) delivering 875 homes in the plan period and 880 homes beyond the plan period, with two adjoining sites (Site L2-SV2 and L2-SV3) delivering 295 dwellings in the plan period.

9.4 As the Preferred Strategy does not identify the two adjacent sites for delivery in the plan period, we are of the view that the Lens 2 assessment of a total of 1,170 dwellings (at Woodlands Garden Community and the two adjacent sites) should and can be delivered at Woodlands Garden Community in the plan period.

9.5 Two adjacent sites (EPS-SV5 and EPS-SV7) to Woodlands Garden Community are also included in the Emerging Preferred Strategy but these will deliver up to 280 beyond the plan period.

9.6 For clarity this document promotes site EPS-FC14 only.

9.7 As part of the analysis work included within the *New Local Plan Phase 3 Towards a preferred strategy (Consultation document 2023),* 3 lenses are considered (L1: Local Plan with no Green Belt Loss, L2: Local Plan Urban Edge, L3: Majority of new homes provided along already established key public transport routes and hubs).

9.8 The Woodlands Garden Community site is included as part of the Lens 2 assessment, and the development assumption is different to that identified in the Emerging Preferred Strategy. The Lens 2 assessment shows the Woodlands Garden Community site (Site L2-FC2) delivering 875 homes in the plan period and 880 homes beyond the plan period, with the two adjoining sites (Site L2-SV2 and L2-SV3) delivering 295 dwellings in the plan period.

9.9 The *New Local Plan Phase 3 Towards a preferred strategy (Consultation document 2023)* states that the Woodlands Garden Community site could deliver 800 homes during the plan period, whilst the Lens 2 assessment assumed 875 homes deliver in the plan period at Woodlands Garden Community.



9.10 In respect of the two sites off Gaunts Earthcott Lane (EPS-SV5 and APS-SV7), the *New Local Plan Phase 3 Towards a preferred strategy (Consultation document 2023)* states that no dwellings will be delivered during the local plan period. However, the Lens 2 assessment states that two sites off Gaunts Earthcott Lane (L2-SV2 and L2-SV3) could deliver 108 a(L2-SV3) and 187 (L2-SV2) dwellings respectively during the local plan period.

9.11 We are of the view that the two sites off Gaunts Earthcott Lane (EPS-SV5 and APS-SV7) are reliant on the Woodlands Garden Community site (L2-FC2 (EPS-FC14) coming forward first in order for the sites off Gaunts Earthcott Lane to be considered to be accessible. In the event that the two sites off Gaunts Earthcott Lane (L2-SV2 and L2-SV3) were to be delivered in isolation then access (vehicle and sustainable access) would be directly from Hortham Lane. There is no footpath provision for around 1km between the two sites off Gaunts Earthcott Lane and the built-up area of Hortham. A less direct route would be also needed to access facilities at Aztec West, Cribbs Causeway, and local Rail stations. The travel distance to Aztec West from the two sites off Gaunts Earthcott Lane (L2-SV2 and L2-SV3) would be at least 750m longer than if those trips were routed through Woodlands Garden Community and which would connect to Woodlands Lane via a new active travel bridge over the M4.

9.12 As such we are of the view that the 1,170 dwellings identified for delivery in the Lens 2 assessment should all be included within the Woodlands Garden Community site, with houses delivered on the two sites off Gaunts Earthcott Lane to be delivered beyond the plan period.

9.13 The Stage 1 Modelling Outputs Report was published in January 2024 confirms that the traffic impact of the Lens 2 assessment (including the 1,170 at Woodlands) is limited and does not suggest a severe impact on the road network. Notwithstanding the above, SWSD is committed to working collaboratively with SGC to undertake detailed modelling and to understand the impact of the Woodlands Garden Community site in isolation. A scope of the assessment is currently being agreed with SGC.

9.14 This document confirms that the site is located in a highly accessible location and is suitably located to provide the opportunity to encourage trips by sustainable modes. The site is located within active travel distances of key areas including Aztec West, Cribbs Causeway, UWE, Filton, and Bristol Parkway Rail Station which provide significant employment retail, education, health, and leisure facilities. Future residents could make us of the existing walking and cycling infrastructure that can be used to access these areas.

9.15 Bus routes are located nearby which provides connections to the areas identified above as well as Bristol City Centre, however we have engaged with the network operator and it has been suggested by First Bus that the T1 service could route through the site whilst also serving its existing route. Further discussion and analysis are required, and we will work with First Bus and SGC to further develop a bus strategy the site.

9.16 Bristol Parkway rail station is located within a comfortable cycle ride from the site which provides frequent services to Bristol, Cardiff, Reading, and London. Access is also available to Patchway station which is slightly closer to the site than Parkway, but operates with a lower level of service.

9.17 This report identifies the following key areas of enhancement that should be considered further:

- Provision of Active Travel Bridge between the site and Woodlands Lane to the west;
- Provision of an Active Travel Link connecting the Trench Lane Roundabout with off-site cycle links (including Concorde Way);
- Review of existing off site cycle links and potential enhancements to these links; and
- Enhance cycle parking facilities at the Metrobus stops on Bradley Stoke Way.

9.18 The Stage 1 Modelling Outputs Report (SGC) was published in January 2024 and does not suggest any notable traffic issues.

9.19 To conclude the allocation of the Woodlands Garden Community will enable the Local Plan to deliver new houses in a highly accessible location which is within active travel distance of significant services and facilities, in this case, Aztec West, Cribbs Causeway, UWE, Filton and Bristol Parkway Rail Station. The scheme could deliver enhancement to active travel and public transport provision in the area which will to only benefit future residents of Woodlands Garden Community but also residents and employees in the surrounding areas.

9.20 We look forward to working with SGC's transport officers to further develop the scheme and in particular the mitigation measures that will ensure the Woodlands Garden Community (WGC) maximises the benefits of its enviable location.

Appendix A Illustrative Masterplan

Woodlands Garden Community

Regulation 18 Transport Submission

SWSD

SLR Project No.: 416.065105/00001

15 February 2024



Masterplan Strategy

Access

1. Main access to the site from Trench Lane and from Gaunt's Earthcott Lane, creating a new strategic urban connection which is well enclosed by development.
2. Secondary or emergency access possible from Trench Lane
3. Public Right of Way (pedestrian route) within across the site retained within a green infrastructure (GI) corridor and serving to connect the existing and new communities towards strategic footpath networks to the north of the site.
4. New on-site pedestrian routes utitise existing shingle trails associated with the golf course and provide circular walks and leisure routes
5. A hierarchy of streets creates a legible residential environment. This includes main and secondary streets, shared surface areas and loops within development parcels, creating a highly accessible environment.
6. Buildings address POS with shared space / private drive frontage to promote quiet streets. All green spaces have frontages overlooking them to provide natural surveillance

1:1,2500

0 100 200m

Landscape

7. Joined up GI network including formal and informal recreation areas, childrens' play, allotments and ecological areas / SUDS. A number of circular walks are available within the GI network.
8. Historic filed boundaries, some still incorporating planting, have been retained to create additional green infrastructure corridors or avenues within the development with reference to local landscape character and ecological habitat/connectivity.
9. A dense landscape edge is proposed to the northern and eastern boundaries based on existing and enhanced planting. This boundary includes hedgerow planting with trees and a shared pedestrian/cycle path.
10. The built form to the northern site boundary redefines the urban edge. Existing hedge planting is proposed to be enhanced with trees, to help integrate development and allow filtered views into/out of the site.
11. Linear habitat creation is intended through the site, in association with the proposed road infrastructure/ drainage features/watercourse/retained hedgerows.
12. The potential to upgrade existing cycle and pedestrian infrastructure immediately adjacent to the site boundaries

Community

13. Two-form entry primary school close to development focus the centre of the site.
14. Potential Local Centre located centrally;
15. Public Open Space includes allotments as well as equipped childrens' play areas.
16. Proposed Commuter cycle route including on and off road sections within the development and providing a strategic connection to Bradley Stoke

client:
South West Strategic Developments

project:
Woodlands

drawing title:
Concept Masterplan

job number: **SWS103**
drawing number: **3207 draft**
scale: **1:2500 @ A1**
drawn: **jvs**
date: **October 2020**
status: **Preliminary**

urbandesignbox.co.uk

Copyright of Urban Design Box. This drawing is for illustrative purposes only and should not be used for any construction or estimation purposes. No liability or responsibility is accepted arising from reliance upon the information contained within this drawing. DO NOT SCALE DRAWINGS.

Urban Design Box

Appendix B Access Design Drawings

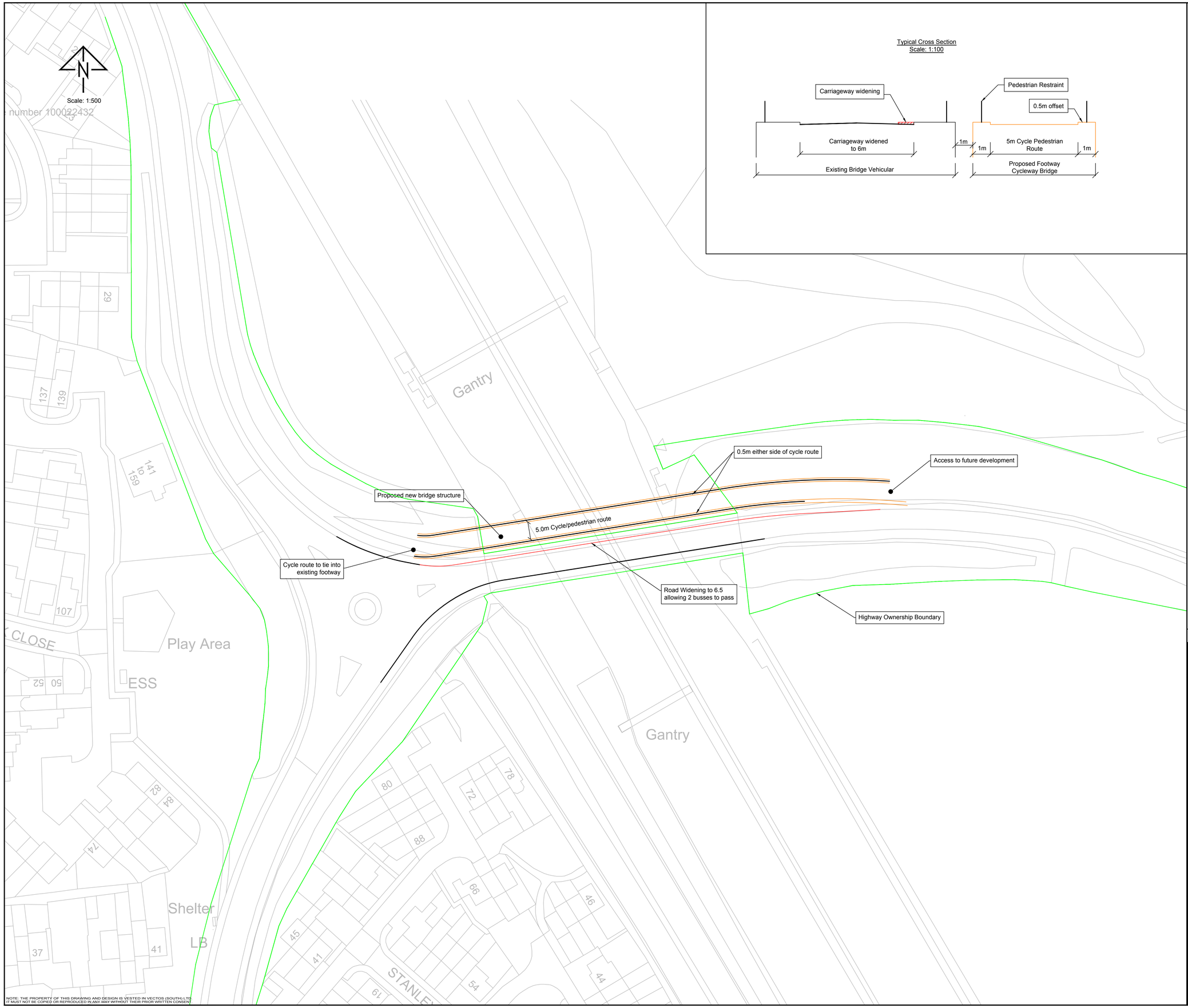
Woodlands Garden Community

Regulation 18 Transport Submission

SWSD

SLR Project No.: 416.065105/00001

15 February 2024



NOTE: THE PROPERTY OF THIS DRAWING AND DESIGN IS VESTED IN VECTOS (SOUTH) LTD. IT MUST NOT BE COPIED OR REPRODUCED IN ANY WAY WITHOUT THEIR PRIOR WRITTEN CONSENT.

REV.	DETAILS	DRAWN	CHECKED	DATE
-	-	-	-	-

STATUS: INFORMATION ONLY

CLIENT: Grass Roots Planning

PROJECT: Woodland Golf Course

DRAWING TITLE: Cycle Route & Carriageway Widening

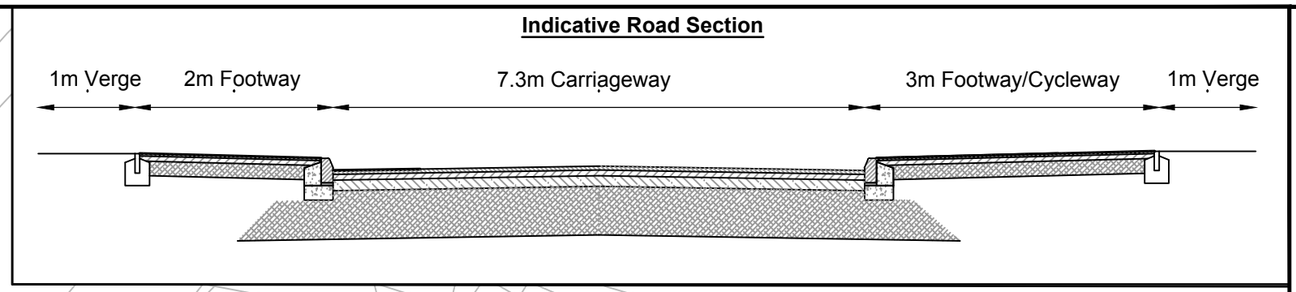
SCALES: AS SHOWN @ A1

DRAWN:	CHECKED:	DATE:
AB	AD	07/2017

vectos transport planning specialists
Broad Quay House, Prince Street, Bristol, BS1 4DJ
t: 0117 905 8888 e: enquiries@vectos.co.uk

DRAWING NUMBER: 162451-GA-01

REVISION: -



NOTE: THE PROPERTY OF THIS DRAWING AND DESIGN IS VESTED IN VECTOS (SOUTH) LTD.
IT MUST NOT BE COPIED OR REPRODUCED IN ANY WAY WITHOUT THEIR PRIOR WRITTEN CONSENT.

Note:
1. All dimensions based on OS Data
2. Land Ownership shown approximate for information only.
3. Speed limit reduced to 30mph.
4. Design based on DMRB standards
5. Levels based on Lidar data
6. Extent of visibility based on assumed horizon due to vertical curve of bridge, to be confirmed.
7. Level and extent of bettering and retaining wall is preliminary only and subject to further detail
8. Priority junction not suitable for significant traffic numbers

REV.	DETAILS	DRAWN	CHECKED	DATE
.	.	.	.	.

STATUS:
INFORMATION ONLY

CLIENT:
Grassroots Planning

PROJECT:
Woodland Golf Course

DRAWING TITLE:
Woodlands Secondary Access
Option 3 - Priority Junction

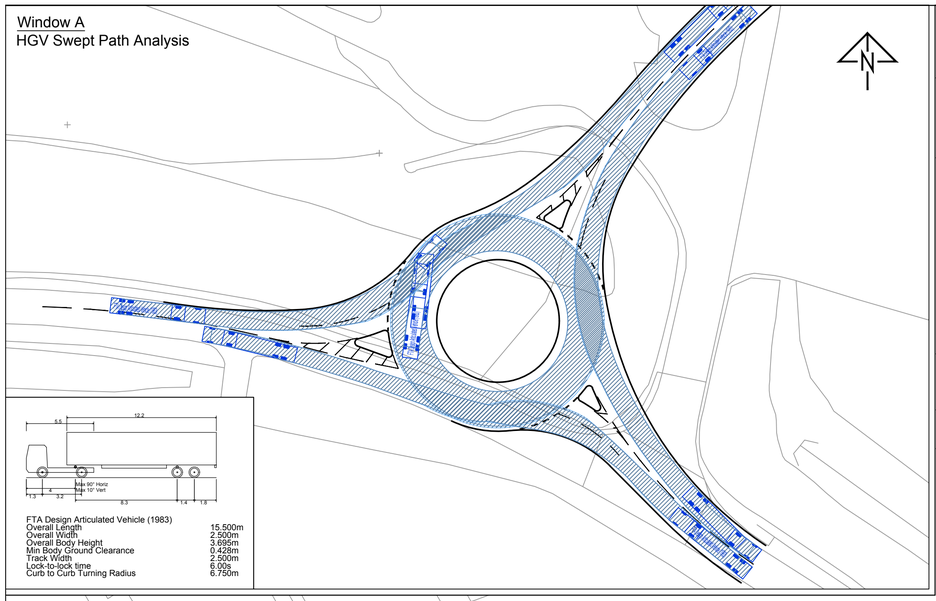
SCALES:
1:500 @ A3

DRAWN:	CHECKED:	DATE:
AB	AD	04/2017

vectos
transport planning specialists
Broad Quay House, Prince Street, Bristol, BS1 4DJ
t: 0117 905 8888 e: enquiries@vectos.co.uk

DRAWING NUMBER:	REVISION:
162451-PHL-03	-

Window A
HGV Swept Path Analysis



FTA Design Articulated Vehicle (1983)

Overall Length	15.500m
Overall Width	2.500m
Overall Body Height	3.695m
Min Body Ground Clearance	0.428m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	6.750m

General Arrangement Plan

Club House

Gantry

TRENCH LANE

80
72
78
88
66
46

Approach half width (m)	3.65
Entry width (m)	7.00
Effective flare length (m)	13.00
Deflection (radii (m))	71
Entry angle (degrees)	33

Approach half width (m)	3.65
Entry width (m)	7.06
Effective flare length (m)	9.53
Deflection (radii (m))	100
Entry angle (degrees)	35

Approach half width (m)	3.65
Entry width (m)	6.39
Effective flare length (m)	6.93
Deflection (radii (m))	100
Entry angle (degrees)	37

Forward visibility at entry

R25

R30

Ø36

R20

160m forward visibility splay, in accordance with DMRB guidance for a national speed limit

Existing accesses to be maintained

NOTE: THE PROPERTY OF THIS DRAWING AND DESIGN IS VESTED IN VECTOS (SOUTH) LTD. IT MUST NOT BE COPIED OR REPRODUCED IN ANY WAY WITHOUT THEIR PRIOR WRITTEN CONSENT.

REV.	DETAILS	DRAWN	CHECKED	DATE
.	.	.	.	.

STATUS: INFORMATION ONLY

Notes

1. All information is indicative only and subject to change at a later stage.

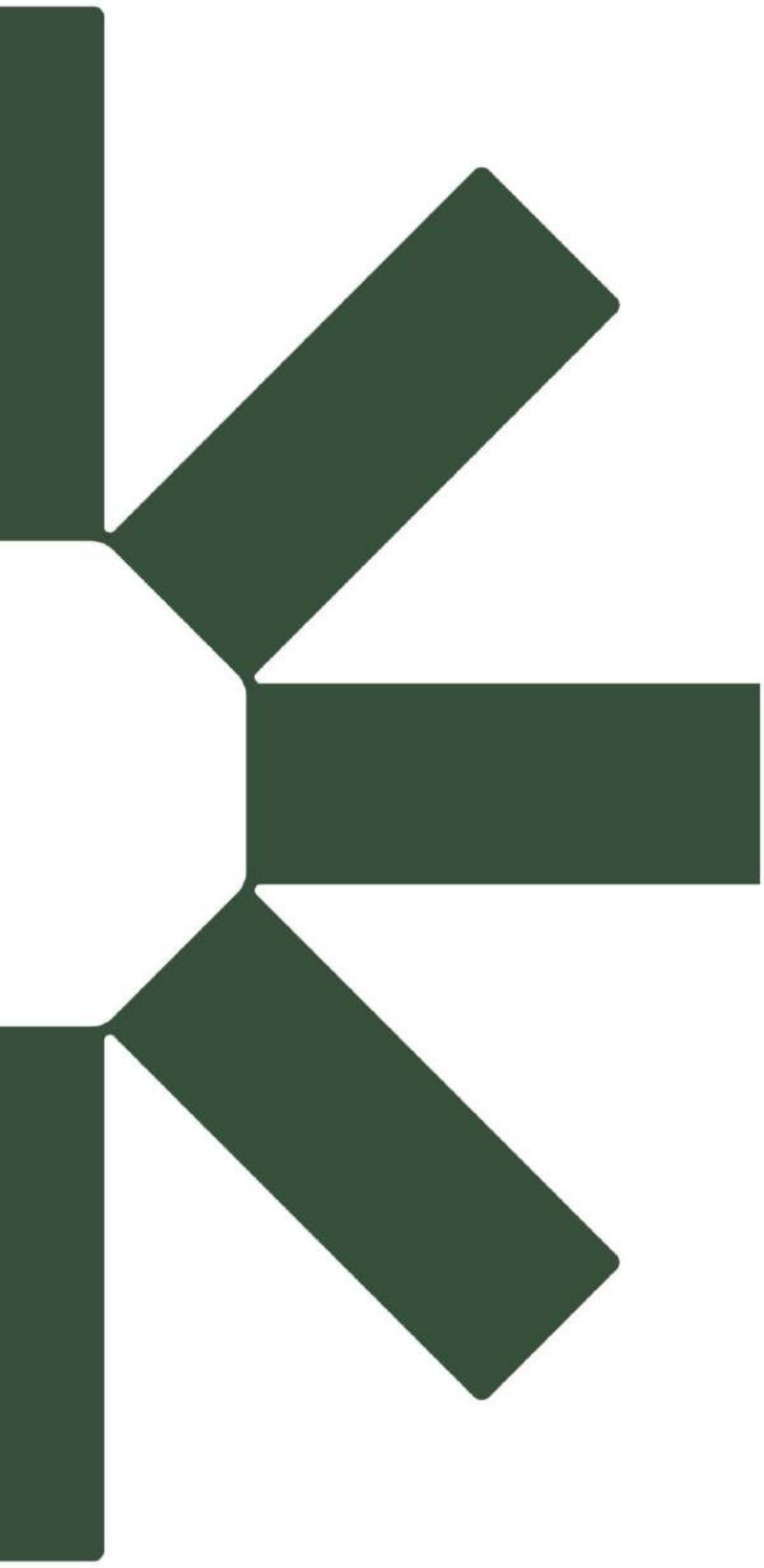
PROJECT: Woodland Golf Course

CLIENT: Grassroots Planning

DRAWING TITLE: Southern Access Arrangement Option 1

vectos transport planning specialists
Broad Quay House, Prince Street, Bristol, BS1 4DJ
t: 0117 905 8888 e: enquiries@vectos.co.uk

DRAWN:	CHECKED:	DATE:	SCALES:	DRAWING NUMBER:	REVISION:
JH	JH	03/07/2017	1:500 @ A1	162451_PHL_06	-



Making Sustainability Happen

Appendix 2 – FRA/Drainage Report

SLR Consulting Limited

South West Strategic Developments

Written Representations – Flood Risk and Drainage Addendum

SLR Project No.: 416.065193.00001

1 February 2024

Revision: 02

RE: LAND AT WOODLANDS GOLF CLUB

1.0 Introduction

1.1 In December 2016, Vectos (South) Ltd (now SLR Consulting Ltd), prepared written representations for the residential development aspirations for Land at Woodlands Golf Course, Bristol.

1.2 Following the publication of the 'Preferred Options' Local Plan document by South Gloucestershire Council in which the site has been selected as an emerging allocation, it is understood that some additional items for consideration have been set out, beyond what was discussed within the original representations. It was noted that:

"*It is likely a solution will be required for the entrance to L2-FC2 Woodlands due to targeted higher flood zones at Trench Lane and Hortham Lane"*.

1.3 It is the purpose of this addendum to provide further information on this regard.

2.0 Trench Lane Access

2.1 The access at Trench Lane is in Flood Zone 1; this is associated with a low flood risk from rivers and the sea. A localised area of surface water flooding is evident on site just to the north of where the access joins Trench Lane.

2.2 Once developed, surface water runoff will be managed using Sustainable Drainage Systems (SuDS). This means that localised areas of surface water flooding will largely disappear. However, it may be necessary to provide a small culvert beneath the access road to allow surface water runoff from landscaped areas to drain beneath it and into Hortham Brook.

2.3 These measures will help to ensure that vehicular access is available from and to the wider highway network during extreme flood conditions.

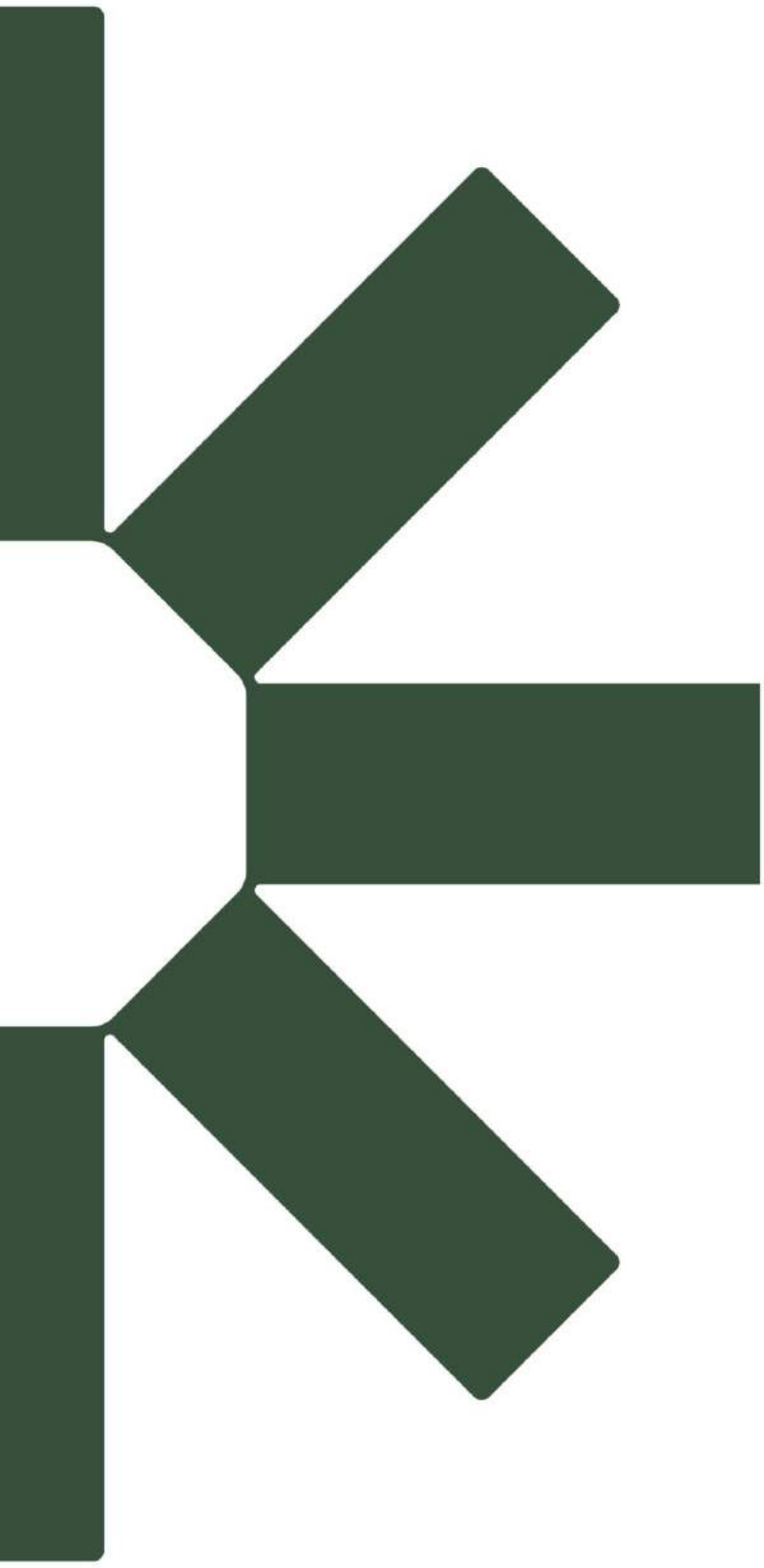
3.0 Hortham Lane Access

3.1 The potential access at Hortham Lane is shown to cross an area of Flood Zone 3; this is associated with a high flood risk from Hortham Brook.

3.2 Hortham Lane is elevated above the floodplain. Therefore, the access road will be raised to join this elevated position. This will ensure that vehicular access is available from and to the wider highway network during extreme flood conditions. However, raising of land in Flood Zone 3 can result in the displacement of floodwater, which can in turn have an adverse impact on third parties. This is not compliant with national or local planning policy. Therefore, the access road proposals will be subject to hydraulic modelling and if an adverse impact is identified, this is likely to be subject to floodplain compensation to mitigate this risk.

4.0 Conclusion

4.1 Through further investigative and/or engineering works as part of the planning submission, it can be concluded that vehicular access is likely to be available from and to the wider highway network during extreme flood conditions from both Trench Lane and Hortham Lane.



Making Sustainability Happen

Appendix 3 – Heritage Report

Built Heritage Note.

Land at Woodland Golf Course (Local Plan Site ID: EPS-FC14)

On behalf of South West Strategic Developments.

Date: 13th February 2024 | Pegasus Ref: P24-0146

Author: Hannah Armstrong, BA(Hons) MSc IHBC ACIfA
Director

Document Management.

Version	Date	Author	Checked/ Approved by:	Reason for revision
1	07.02.2024	HA	AR	-
2	13.02.2024	HA	HA	Minor text edits.

Contents.

1. Introduction 1
2. The Built Historic Environment 3
3. Assessment of Potential Impact. 12
4. Summary Conclusions 15

Appendices contents.

Appendix 1: Methodology 17
Appendix 2: Site Photographs. 23

1. Introduction

1.1. This Built Heritage Note has been prepared by on behalf of South West Strategic Developments in relation to the development of Woodland Golf Course, as currently being considered via the South Gloucestershire Local Plan (Site ID: EPS-FC14). The redline for Site ID: EPS-FC14 (henceforth referred to as 'the Site') is provided at Plate 1, with the area being promoted for mixed residential and commercial use.

1.2. The Site comprises the existing Woodland Golf Course complex, and is bound by the M4 and M5 motorways to the west and north respectively, Trench Lane to the south and open fields to the east and northeast. The majority of the Site comprises the main golf course complex and a fishing lake, the landform, topography and character of which is man-made. The club house and associated car park is located in the southern part of the Site. In general, the character and appearance of the Site is one of a modern, man-made landscape, with the two motorways beyond the Site visible and audible, and modern development beyond.

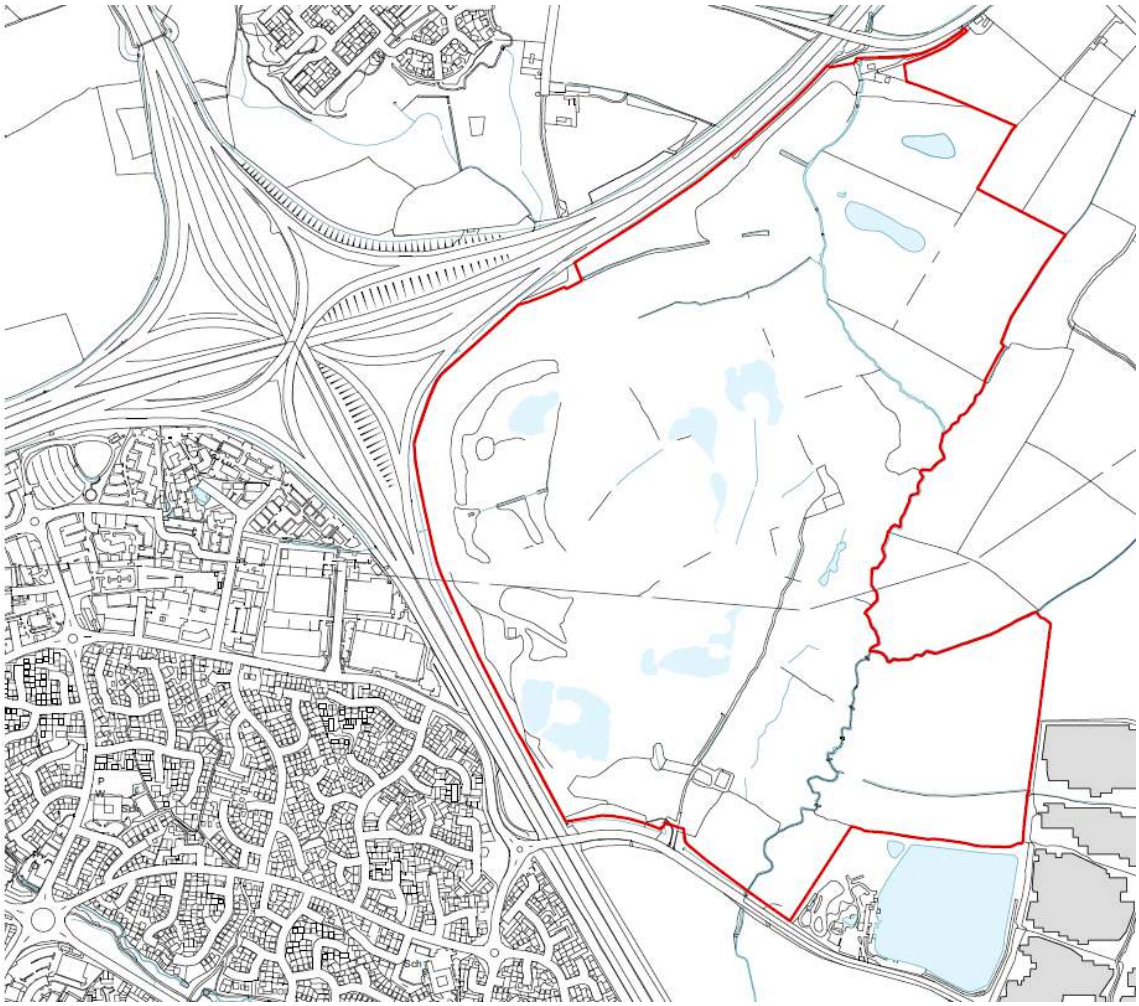


Plate 1: Site location plan.

1.3. This Note considers the following key points, the aim of which is to inform how potential impacts on the built historic environment should be considered within the allocation process:

- The identification of built heritage assets that have the potential to be sensitive to the redevelopment of the Site.
- An assessment of the contribution made by the Site to such significance via 'setting', as applicable.
- An assessment of the potential impact of the redevelopment of the Site 'in principle' to the heritage significance of relevant heritage assets.
- An assessment of potential impact of the emerging masterplan to the heritage significance of relevant heritage assets.
- A summary of potential impacts and how these should be viewed in the planning process.

1.4. The level of information provided is proportionate to the context in which the Site is currently being considered, and is prepared in the context that any future planning application would be accompanied by a detailed Heritage Statement addressing both built heritage and below ground archaeology, as applicable. The Methodology utilised in the preparation of this Note detailed at **Appendix 1**.

1.5. A selection of photographs which help to illustrate the discussions in **Section 2** are included at **Appendix 2**. The photographs are not accurate visual representations of the site or development proposals, nor do they conform to any standard or guidance i.e., the Landscape Institute Technical Guidance Note 06/19. However, the photographs included are intended to be an honest representation and are taken without the use of a zoom lens or edited, unless stated in the description or caption.

2. The Built Historic Environment

2.1. There are no built heritage assets, designated or non-designated, located within the bounds of the Site.

2.2. Step 1 of the methodology recommended by *GPA3* (see methodology), is to identify which heritage assets might be affected by a proposed development.[1] Development proposals may adversely impact heritage assets where they remove a feature which contributes to the significance of a heritage asset, or where they interfere with an element of a heritage asset's setting which contributes to its significance, such as interrupting a key relationship or a designed view.

2.3. The high-level site appraisal prepared by South Gloucestershire Council in relation to the Site identifies the group of designated heritage assets at Gaunt's Earthcott to the northeast as having the potential to be sensitive to the redevelopment of the Site, with these comprising the:

- Group of heritage assets at Manor Farm, comprising the Grade II* Listed Manor Farmhouse, Grade II Listed Wall and non-designated Local Historic Park and Garden, located *c.*400m northeast of the Site at its closest point.
- Grade II Listed Court Farm Farmhouse, located *c.*545m northeast of the Site.
- Grade II Listed Green Farm Farmhouse, located *c.*580m northeast of the Site.

2.4. These assets are thus considered further below, with their location detailed at Plate 2. List Entries for the designated heritage assets are included at **Appendix 3**.

2.5. The three aforementioned farmsteads, alongside later detached dwellings, form the settlement of Gaunt's Earthcott, a dispersed hamlet situated within the parish of Almondsbury.

2.6. Consideration, based upon professional judgement and on-site analysis, was made as to whether any of the additional built heritage assets present within the surrounding area may include the Site as part of their 'setting', whether the Site contributes to their overall heritage significance, and whether the assets may potentially be affected by the proposed scheme as a result.

2.7. This has concluded that the Site does not form part of 'setting' that positively contributes to overall heritage significance of any further built heritage assets due the nature of the asset and a lack of visual connections, spatial relationships or historic connections. This includes the group of designated and non-designated built heritage assets on the western side of Trench Lane *c.*600m+ east of the Site. Accordingly, the development of the Site is not anticipated to result in a change that would impact upon the overall heritage significance of other built heritage assets in the environs of the Site.

[1] Historic England, *GPA:3*, p. 4.

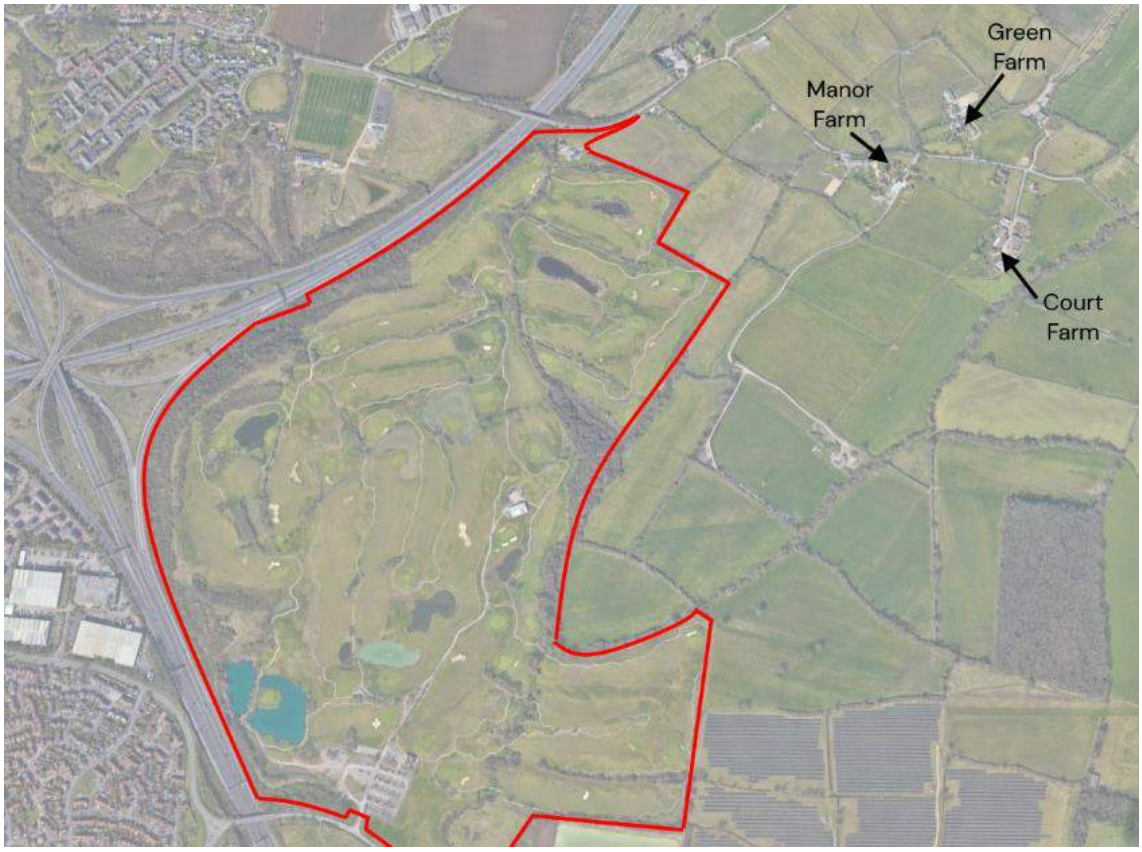


Plate 2: Aerial photograph detailing the Site (approximate boundary shown in red) in relation to the identified heritage assets.

Group of Heritage Assets at Manor Farm

2.8. The Grade II* Listed Manor Farm Farmhouse comprises a former medieval / post-medieval farmhouse with a 16th-century core, and later 17th, 19th and 20th-century alterations. The asset is set within a defined domestic garden on the southern side of Gaunt's Earthcott Lane. Located to the east of the farmhouse is a Grade II Listed 18th-century wall, incorporating gate piers and a mounting block.

2.9. The domestic gardens within which the above are sited are classified by South Gloucestershire Council as a 'Local Historic Park and Garden' (a non-designated heritage asset in the terms of the NPPF). The garden is a described on Know Your Place as a *'modern garden incorporating 17th-century features; 3 walled gardens; stone seats; sundial; modern planting in period'*. The northern part of the garden was clearly visible from the lane to the north at the date of survey, with observations concluding that the asset is of limited significance, at most.

2.10. Located to the south of the above group is the historic farmstead, the built form of which has been subject to residential conversion with further change arising from the construction of new dwellings and agricultural buildings in the 20th and 21st centuries. The current composition of the wider farmstead is much altered from the historic arrangement both in terms of form and character. Development now provides a notable physical and visual barrier between the farmhouse and the wider landscape to the south, with further

change associated with land use changes, i.e., a historic orchard to the south of the farm complex has been removed.

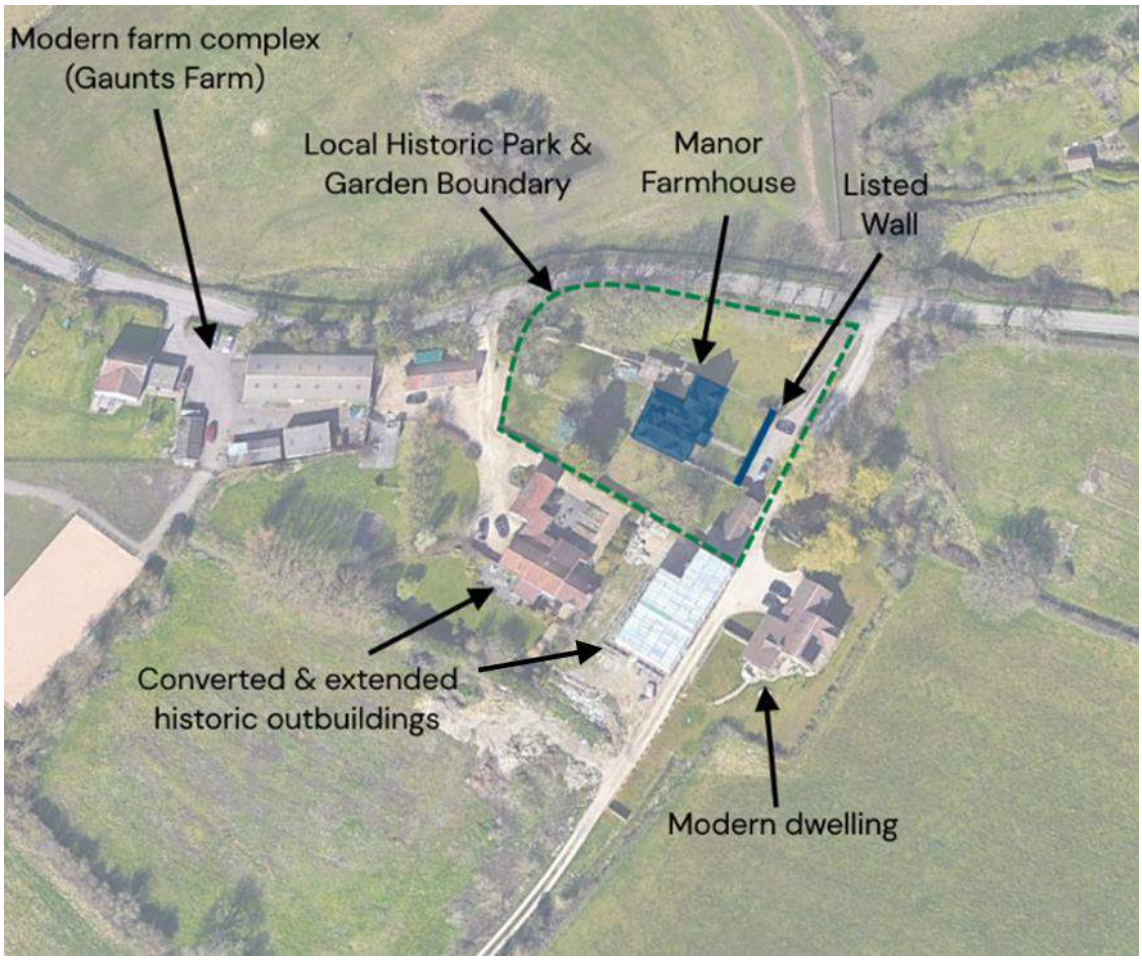


Plate 3: Aerial photograph detailing the assets at Manor Farm and other buildings within its immediate environs.

2.11. A review of archival sources has demonstrated that part of the Site historically formed part of the landholdings associated with the farmhouse, owned by Henry Bengough Esq. and tenanted by Jacob Thomas (see Plate 4). The remainder of the Site was also under the ownership of Bengough, but occupied by separate tenants and thus did not form part of the landholdings associated with Manor Farm, i.e., Bengough held a large estate which included a variety of farmsteads, and thus a functional connection did not exist between all aspects of Bengough's estate.

2.12. This historic functional connection is no longer clearly understood due to the changes which have occurred to the south of the farmhouse (as set out above) and within the Site in the 20th and 21st centuries. Specifically:

- The changes to the south of the farmhouse have impacted upon the spatial and visual relationship between the farmhouse and the former land holdings to the south.

- The development of Woodlands Golf Course has removed the agricultural character and field morphology of the former landholdings as historically located within the bounds of the Site.



Plate 4: Plan of the Site with the extent of the former landholdings associated with Manor Farm highlighted in purple.

2.13. Very limited glimpsed views of upper elements of the roof of the farmhouse may be possible from the far northern part of the Site. In such views, the main element of the house would be obscured by development to the south and intervening mature vegetation, with no understanding as to the overall form or detailing of the farmhouse. No views of the Listed Wall or gardens are anticipated for the same reasoning.

2.14. Due to screening provided by development to the south of the group, and intervening mature vegetation, no views of the Site are anticipated to be obtainable from the farmhouse, Listed Wall or the gardens. No co-visibility between the group and the Site from Gaunt's Earthcott Lane was identified during the Site visit.

Statement of Significance

2.15. The heritage significance of Grade II* Listed Manor Farm Farmhouse is primarily derived from the architectural and historic interest of its physical fabric as an example of a 16th-century farmhouse which has developed throughout the post-medieval and modern periods.

2.16. The heritage significance of the Grade II Listed Wall is primarily derived from the architectural and historic interest of their physical fabric as an example of a 18th-century boundary feature.

2.17. Any heritage significance that the non-designated park and garden may be deemed to hold would primarily derived from the historic and aesthetic interest of the space as an example

of a modern garden which has sought to incorporated earlier designed landscape and garden features. However, as set out above, we considered that the asset is of limited significance, at most, based upon the observations made during the site visit.

2.18. The 'setting' of the assets also contribute to their significance, although the significance derived from their 'setting' is less than that derived from its historic fabric. It is also important to take into account the level of change which has previously occurred in the immediate surrounds of the Site, as discussed above. Furthermore, the elements of their 'setting' which contribute to their significance differs from asset to asset due to their differing nature; however, the 'group value' and joint experience is a common positive factor to all.

The 'Setting' of Manor Farmhouse

2.19. The principal elements of the physical surrounds and experience of Manor Farmhouse (its "*setting*") which are considered to contribute to its heritage significance comprise:

- The physical and visual relationship between the farmhouse, the wall and the wider garden, and the contribution which this makes to the overall understanding and experience of the asset.
- The physical and visual relationship between the farmhouse and the remnants of the former historic farmstead to the south (for example, the converted former agricultural buildings), and the contribution which this makes to the overall understanding and experience of the asset.
- The glimpsed views of the farmhouse from Gaunt's Earthcott Lane and the contribution which this makes to the experience and appreciation of the asset.
- The spatial relationship between Manor Farm, Court Farm and Green Farm in forming the historic elements of the dispersed hamlet of Gaunt's Earthcott.

2.20. As a result of the changes which have occurred to the south of the group in the 20th and 21st centuries (as discussed above) the historic associative and functional connection between the farmhouse and its former landholdings is not considered to form part of the 'setting' of the asset which now contributes to its heritage significance.

2.21. The only elements of the former landholdings which can be considered to make any form of positive contribution to the understanding and experience of the group is the immediate agricultural hinterland (and former landholdings) which lie to the immediate south, beyond the modern and converted historic buildings. Due to the level of physical and spatial separation which has occurred as a result of 20th and 21st-century development, the contribution made by these areas to the overall heritage significance of the group is now considered to be limited.

2.22. Whilst aspects of the Site once formed part of the agricultural landholdings associated with Manor Farm, this is no longer understood or appreciated due to the previous, and well established change in use and character of the Site from agricultural land to a modern golf course. This, coupled with the spatial and visual separation noted above, leads to the conclusion that any historic association or functional connections between the former landholdings within the Site and the asset no longer contributes to its overall heritage significance due to the lack of understanding and intelligibility.

2.23. As detailed above, there are no strong visual connections between the Site and the asset, and where glimpsed views may be obtainable, they do not enhance the understanding, experience or appreciation of the farmhouse.

2.24. Overall, when taking into account the current baseline, the Site is considered to form part of the setting of Manor Farm Farmhouse which makes a neutral contribution to its overall heritage significance, neither contributing to nor detracting from its heritage significance.

The 'Setting' of the Grade II Listed Wall

2.25. The principal elements of the physical surrounds and experience of Listed Wall (its "*setting*") which are considered to contribute to its heritage significance comprise:

- The physical relationship between the wall, the farmhouse and garden.
- The experience and appreciation of the wall from within the bounds of the garden.

2.26. The Site is not considered to form part of the setting of the Listed Wall which contributes to its overall heritage significance.

The 'Setting' of the Non-Designated Garden

2.27. Analysis of the current form of the garden and archival sources does not indicate that views into or out of the garden area formed a key part of its design intent, nor did the physical relationship with the wider Manor Farm complex. When taking into account the current baseline, it is not considered that the 'setting' of the non-designated garden contributes to its overall heritage significance.

2.28. The Site is not considered to form part of the setting of the non-designated garden which contributes to its overall heritage significance.

Summary Conclusions

2.29. In summary, the Site is considered to form part of the 'setting' of the Grade II Listed Manor Farmhouse which makes a neutral contribution to its overall heritage significance. The Site is not, however, considered to form part of the 'setting' of the Listed Wall and non-designated garden.

Grade II Listed Court Farm

2.30. The Grade II Listed Court Farm was added to the National List in October 1952, and comprises a 17th-century farmhouse, with later 19th and 20th-century alterations. The South Gloucestershire Historic Environment Record (HER) identifies that the northwest corner of the farmhouse likely comprised a medieval chapel, with the presence of a chapel denoted on historic mapping.

2.31. The asset is situated amongst a farmstead complex, comprising modern and historic structures, to the south of Gaunt's Earthcott Lane. The principal elevation is to the southeast where the asset faces an enclosed domestic garden and a series of agricultural buildings beyond.



Plate 5: Aerial view of Court Farm Farmhouse as set within its current farmstead complex.

2.32. A review of archival sources has demonstrated that the historic landholdings associated with the Court Farm farmstead were located to the immediate east, south and west of the complex. Whilst much of the Site was historically in the same overall ownership as Green Farm (owned by Henry Bengough Esq.), differences in recorded tenants indicates that such areas did not form part of the land tenanted as part of Court Farm (see comments above regarding the Bengough estate as whole).

2.33. Views of Court Farm from within the Site were not identified during the site visit. Furthermore, based upon onsite observations it is not anticipated that views of the Site as currently extant are obtainable from the asset. Should they be obtainable, it is anticipated that any views would be isolated to views from the upper floor of the secondary west elevation. In such views the Site is anticipated to be read as an area of undeveloped land, with a modern leisure character, beyond the immediate built environs of Gaunt's Earthcott as positioned along Gaunt's Earthcott Lane, with a variety of modern features (such as overhead power lines) also visible.

Statement of Significance

2.34. The heritage significance of Court Farm is primarily derived from the architectural and historic interest of its physical fabric as an example of a 17th-century farmhouse, with later alterations, potentially incorporating an earlier medieval chapel.

2.35. The 'setting' of the asset also contributes to the significance of the asset, although the significance derived from the setting is less than that derived from its historic fabric. The principal elements of the physical surrounds and experience of the asset (its "*setting*") which are considered to contribute to its heritage significance comprise:

- The spatial and visual relationship with the associated farmstead, in particular the understanding and experience of the two.
- The experience and appreciation of the asset from the immediate agricultural landscape which surrounds the asset to the east, south and west, i.e., the experience and appreciation of the asset from within the bounds of its historic agricultural hinterland.
- The spatial relationship between Court Farm, Manor Farm and Green Farm in forming the historic elements of the dispersed hamlet of Gaunt's Earthcott.

2.36. As set out above, there are no known historic functional connections between the operation of Court Farm and the Site. Whilst noting the land ownership, due to the lack of functional connections, this is not considered sufficient to result in the Site forming part of the 'setting' which contributes to its overall heritage significance.

2.37. Furthermore, there is not clear visual connectivity between Court Farm and the Site. Should the Site be possible from the asset, such views are not anticipated to contribute to the overall understanding, experience or appreciation of the asset, in particular when taking into account the current baseline, distance and mature intervening vegetation.

Summary Conclusions

2.38. In summary, the Site is not considered to form part of the 'setting' of the Grade II Listed Court Farm which contributes to its overall heritage significance.

2.39. It is, however, recognised that the development of the Site could introduce built form into the Site which may be visible from the asset. Thus, despite the above conclusions, Green Farm will be discussed in **Section 3** as applicable.

Grade II Listed Green Farm

2.40. The Grade II Listed Green Farm was added to the National List in October 1952 and comprises a late 17th-century farmhouse, with 18th, 19th and 20th-century additions and alterations.

2.41. The asset is set amongst its historic farmstead complex (elements of which may now have been converted for separate residential use) on the north side of Gaunt's Earthcott Lane. The principal dwelling faces southwards across a domestic garden and towards the Lane beyond, with the secondary elements more commonly associated with the wider farmstead

complex. The farmhouse is visible set amongst the farmstead from the Lane, and its agricultural environs to the north, east and west.



Plate 6: Aerial view of Green Farm Farmhouse as set within its current farmstead complex.

2.42. A review of archival sources has demonstrated that the historic landholdings associated with the Green Farm farmstead were located to the north, east and west of the complex to the north of Gaunt's Earthcott Lane. Whilst much of the Site was historically in the same overall ownership as Green Farm (owned by Henry Bengough Esq.), differences in recorded tenants indicates that such areas did not form part of the land tenanted as part of Court Farm (see comments above regarding the Bengough estate as whole).

2.43. Views of Green Farm from within the Site were not identified during the site visit. Furthermore, based upon onsite observations it is not anticipated that views of the Site as currently extant are obtainable from the asset. Should they be obtainable, it is anticipated that any views would be isolated to views from the upper floor of the secondary west elevation. In such views, the Site is anticipated to be read as an area of undeveloped land, with a modern leisure character, beyond the immediate built environs of Gaunt's Earthcott as positioned along Gaunt's Earthcott Lane, with a variety of modern features (such as overhead power lines) also visible.

Statement of Significance

2.44. The heritage significance of Green Farm is primarily derived from the architectural and historic interest of its physical fabric as an example of a 17th-century farmhouse which has developed throughout the post-medieval and modern periods.

2.45. The 'setting' of the asset also contributes to the significance of the asset, although the significance derived from the setting is less than that derived from its historic fabric. The principal elements of the physical surrounds and experience of the asset (its "*setting*") which are considered to contribute to its heritage significance comprise:

- The spatial and visual relationship with the associated farmstead, in particular the understanding and experience of the two.
- The experience and appreciation of the asset from Gaunt's Earthcott Lane.
- The experience and appreciation of the asset from the immediate agricultural landscape which surrounds the asset to the north, east and west, i.e., the experience and appreciation of the asset from within the bounds of its historic agricultural hinterland.
- The spatial relationship between Green Farm, Court Farm and Manor Farm in forming the historic elements of the dispersed hamlet of Gaunt's Earthcott.

2.46. As set out above, there are no known historic functional connections between the operation of Green Farm and the Site. Whilst noting the land ownership, due to the lack of functional connections, this is not considered sufficient to result in the Site forming part of the 'setting' which contributes to its overall heritage significance.

2.47. Furthermore, there is not clear visual connectivity between Green Farm and the Site. Should views of the Site be possible from the asset, such views are not anticipated to contribute to the overall understanding, experience or appreciation of the asset, in particular when taking into account the current baseline, distance and mature intervening vegetation.

Summary Conclusions

2.48. In summary, the Site is not considered to form part of the 'setting' of the Grade II Listed Green Farm which contributes to its overall heritage significance.

2.49. It is, however, recognised that the development of the Site could introduce built form into the Site which may be visible from the asset. Thus, despite the above conclusions, Green Farm will be discussed in **Section 3** as applicable.

3. Assessment of Potential Impact.

3.1. The following provides an overview of the potential impact that may occur from the development of the Site on the heritage significance of the group of heritage assets at Gaunt's Earthcott (as discussed in **Section 2**), as a result of a change in 'setting'. It will first consider potential impacts associated with the development of the Site as a generalised concept, followed by a consideration of the masterplan which forms part of the wider promotional package. It will also consider the potential impact of other proposed allocation sites on the impacts that would arise from the development of the Site.

Development of the Site 'In-Principle'

3.2. The development of the Site would 'in-principle' result in a change in character to land within its bounds (from modern leisure to urban environment). With specific regard to Manor Farm Farmhouse, this would result in a further change in character to part of the historic landholdings associated with the farm complex; however, as set out in **Section 2** the former landholdings within the Site are not considered to contribute to the significance of the asset due to the level of change which has already occurred.

3.3. The development of the Site would bring modern development closer to the group of heritage assets at Gaunt's Earthcott. However, due to the separation between the Site and the group of heritage assets at Gaunt's Earthcott (*c.*400m at their closest point), a clear separation between the new development and the detached hamlet would remain.

3.4. Modern built form may be visible from group of heritage assets at Gaunt's Earthcott, and/or co-visible with the assets from within the bounds of Site and the wider environs.

3.5. When taking into account the manner in which the Site contributes to the overall heritage significance of the group of heritage assets at Gaunt's Earthcott (see **Section 2**), and in the context of the change that would occur from the development of the Site 'in-principle', it is anticipated that this could result in:

- Less than substantial harm, at the lower end of the spectrum at most, to the Grade II Listed Manor Farmhouse.
- Less than substantial harm, at the very lower end of the spectrum at most, to the Grade II Listed Court Farm.
- Less than substantial harm, at the very lower end of the spectrum at most, to the Grade II Listed Green Farm.
- No harm to the Grade II Listed Walls at Manor Farm.
- No harm to the non-designated Local Park and Garden at Manor Farm.

3.6. It has, however, highlighted that the above is derived from the consideration of 'development' of the land in general and does not take into account how layout and design (including height and massing) could reduce or remove potential impacts.

Consideration of the Emerging Masterplan

3.7. The following considers the masterplan which forms part of the wider promotional package as shown on DWG No. 3207.

3.8. With specific regard to the consideration of the above heritage assets, the following aspects of the layout and design principles are noted:

- The northern parts of the Site closest to Gaunt's Earthcott would be utilised as public open space and a dense landscape edge introduced.
- Development in the northern part of the Site would be limited to residential development. Built form would be positioned *c.*490m from the group of assets at Manor Farm, *c.*620m from Court Farm and *c.*670m from Green Farm. Thus, a clear separation would remain between the new development, the assets and the hamlet in general. This, coupled with the proposed landscaping referenced above, and further design consideration of the height and design of buildings in the northern part of the Site would reduce the extent to which the new development may be visible from the assets.
- The potential mixed use local centre and school site would be positioned in the central part of the Site, beyond a new linear landscaped area.
- PRoW connections which extend from the Site towards Gaunt's Earthcott will remain, and thus the ability to appreciate the assets, including as set within a disbursed hamlet, on the approach from southwest would remain.
- Whilst the proposals include a main access point from Gaunt's Earthcott Lane, this is set some distance from the designated heritage assets and adjacent to the modern road bridge which crosses the M5 motorway. The positioning of the access in this location would prevent a change in character to Gaunt's Earthcott Lane in the vicinity of the assets.

3.9. When taking into account the layout and design measures embedded in the masterplan (DWG No. 3207), and the manner in which detailed design could further influence matters, it is anticipated that the harm arising to the identified heritage assets at Gaunt's Earthcott as a result of its implementation would be as follows:

- Less than substantial harm at the very lower end of the spectrum, at most, to the Grade II Listed Manor Farmhouse.
- No harm to the Grade II Listed Court Farm.
- No harm to the Grade II Listed Green Farm.
- No harm to the Grade II Listed Walls at Manor Farm.
- No harm to the non-designated Local Park and Garden at Manor Farm.

4. Summary Conclusions.

4.1. In summary, the only built heritage assets that have been identified as sensitive to the development of Land at Woodland Golf Course (Site ID: EPS-FC14) are:

- Group of heritage assets at Manor Farm, comprises the Grade II* Listed Manor Farmhouse, Grade II Listed Wall and non-designated Local Historic Park and Garden, located *c.*400m northeast of the Site at its closest point.
- Grade II Listed Court Farm Farmhouse, located *c.*545m northeast of the Site.
- Grade II Listed Green Farm Farmhouse, located *c.*580m northeast of the Site.

4.2. Subject to design (included measures shown on the masterplan which forms part of the wider promotional package) it is concluded that development could come forward at Land at Woodland Golf Course which would result in:

- Less than substantial harm at the lower end of the spectrum, at most, to the Grade II Listed Manor Farm Farmhouse.
- No harm to the Grade II Listed Court Farm, Grade II Listed Green Farm and the Grade II Listed Walls and non-designated local park and garden at Manor Farm.

4.3. Section 66(1) of the Planning (Listed Buildings and Conservation Areas) Act 1990 states:

"In considering whether to grant planning permission [or permission in principle] for development which affects a listed building or its setting, the local planning authority or, as the case may be, the Secretary of State, shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses."[2] (our emphasis)

4.4. Key is the use of the terms 'special regard' and 'desirability'. Section 66(1) does not state that where a development does not preserve or enhance a development that it must be considered contrary to legislation and should be refused.

4.5. This is echoed in the 'Palmer' case, which whilst considering Listed Buildings, sets out that:

"Although the statutory duty requires special regard to be paid to the desirability of not harming the setting of a listed building, that cannot mean that any harm, however minor, would necessarily require planning permission to be refused."[3]

4.6. As clarified by the Court of Appeal ('Mordue'[4]), where the principles of the NPPF (specifically that now given under §208 of the NPPF) are applied this is in keeping with the duties of the Planning (Listed Buildings and Conservation Areas) Act 1990, which requires

[2] UK Public General Acts, Planning (Listed Buildings and Conservation Areas) Act 1990, Section 66(1).
[3] Palmer v Herefordshire Council & Anor [2016] EWCA Civ 1061. Paragraph 34.
[4] Jones v Mordue [2015] EWCA Civ 1243.

'special regard' to be paid to 'desirability of preserving the architectural and historic interest of a Listed Building, including any contribution made by its 'setting'.

4.7. In regard to demonstrating the 'clear and convincing justification', the Courts ('Pugh'[5]) have held that where the decision-maker works through the sequence for dealing with proposals which impact upon heritage assets in the context of §205-208 of the NPPF and finds that any harm to significance is outweighed by public benefits, then the clear and convincing justification referred to at §206 of the NPPF is in place.

4.8. The above points are made in full recognition of the 'great weight' referred to in §199 of the NPPF and the 'Barnwell' decision[6] which established that there is a strong presumption against the granting of planning permission where development proposals would cause harm to the significance of a designated heritage asset. It is, however, highlighted that a subsequent High Court Decision ('Forge Fields'[7]) concluded: "*The presumption is a statutory one. It is not irrebuttable. It can be out weighed by material considerations powerful enough to do so.*" The public benefits exercise is one such consideration, in the same way that it is a consideration for meeting the statutory duty of Section 66(1) and the need to provide 'clear and convincing justification' as outlined above.

4.9. Accordingly, the harm identified to Manor Farm Farmhouse, should not be viewed as an overriding and 'in-principle' constraint to the allocation of the Site, in particular when taking into account the low level of harm identified and how design measures could reduce or remove harm.

[5] Pugh v SoS for Communities and Local Government [2015] EWHC 3 (Admin)
[6] Barnwell Manor Wind Energy Ltd v (1) East Northamptonshire DC & Others [2014] EWCA Civ 137.
[7] R (Forge Field Society) v Sevenoaks District Council [2014] EWHC 1895 (Admin)

Appendix 1: Methodology.

Assessment of Significance

In the *NPPF*, heritage significance is defined as:

> ***"The value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting. For World Heritage Sites, the cultural value described within each site's Statement of Outstanding Universal Value forms part of its significance."***[8]

Historic England's *GPA:2* gives advice on the assessment of significance as part of the application process. It advises understanding the nature, extent, and level of significance of a heritage asset.[9]

In order to do this, *GPA 2* also advocates considering the four types of heritage value an asset may hold, as identified in English Heritage's *Conservation Principles*.[10] These essentially cover the heritage 'interests' given in the glossaries of the *NPPF* and the *PPG* which are archaeological, architectural and artistic, and historic.[11]

The *PPG* provides further information on the interests it identifies:

- ***Archaeological interest:*** *As defined in the Glossary to the National Planning Policy Framework, there will be archaeological interest in a heritage asset if it holds, or potentially holds, evidence of past human activity worthy of expert investigation at some point.*

- ***Architectural and artistic interest:*** These are interests in the design and general aesthetics of a place. They can arise from conscious design or fortuitously from the way the heritage asset has evolved. More specifically, architectural interest is an interest in the art or science of the design, construction, craftsmanship and decoration of buildings and structures of all types. Artistic interest is an interest in other human creative skills, like sculpture.

- ***Historic interest*:** An interest in past lives and events (including pre-historic). Heritage assets can illustrate or be associated with them. Heritage assets with historic interest not only provide a material record of our nation's history, but can also provide meaning for communities derived from their collective experience of a place and can symbolise wider values such as faith and cultural identity.[12]

Significance results from a combination of any, some, or all of the interests described above.

---

[8] DLUHC, *NPPF*, Annex 2.
[9] Historic England, *GPA:2*.
[10] Historic England, *Conservation Principles: Policies and Guidance for the Sustainable Management of the Historic Environment* (London, April 2008). These heritage values are identified as being 'aesthetic', 'communal', 'historical' and 'evidential', see idem pp. 28–32.
[11] DLUHC, *NPPF*, *Annex 2*; DLUHC, *PPG, paragraph 006, reference ID: 18a-006-20190723*.
[12] DLUHC, *PPG*, paragraph 006, reference ID: 18a-006-20190723.

Historic England guidance on assessing heritage significance, *HEAN:12*, advises using the terminology of the *NPPF* and *PPG*, and thus it is that terminology which is used in this Report. [13]

Setting and Significance

As defined in the NPPF:

> ***"Significance derives not only from a heritage asset's physical presence, but also from its setting."***[14]

Setting is defined as:

> ***"The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral."***[15]

Therefore, setting can contribute to, affect an appreciation of significance, or be neutral with regards to heritage values.

Assessing Change Through Alteration to Setting

How setting might contribute to these values has been assessed within this Report with reference to *GPA:3*, particularly the checklist given on page 11. This advocates the clear articulation of "*what matters and why*".[16]

In *GPA:3*, a stepped approach is recommended, of which Step 1 is to identify which heritage assets and their settings are affected. Step 2 is to assess whether, how and to what degree settings make a contribution to the significance of the heritage asset(s) or allow significance to be appreciated. The guidance includes a (non-exhaustive) checklist of elements of the physical surroundings of an asset that might be considered when undertaking the assessment including, among other things: topography, other heritage assets, green space, functional relationships and degree of change over time. It also lists aspects associated with the experience of the asset which might be considered, including: views, intentional intervisibility, tranquillity, sense of enclosure, accessibility, rarity and land use.

Step 3 is to assess the effect of the proposed development on the significance of the asset(s). Step 4 is to explore ways to maximise enhancement and minimise harm. Step 5 is to make and document the decision and monitor outcomes.

A Court of Appeal judgement has confirmed that whilst issues of visibility are important when assessing setting, visibility does not necessarily confer a contribution to significance and factors other than visibility should also be considered, with Lindblom LJ stating at paragraphs 25 and 26 of the judgement (referring to an earlier Court of Appeal judgement):

---

[13] Historic England, *Statements of Heritage Significance: Analysing Significance in Heritage Assets, Historic England Advice Note 12* (Swindon, October 2019).
[14] DLUHC, *NPPF*, Annex 2.
[15] DLUHC, *NPPF*, Annex 2.
[16] Historic England, *GPA:3*, pp. 8, 11.

> ***Paragraph 25 – "But – again in the particular context of visual effects – I said that if "a proposed development is to affect the setting of a listed building there must be a distinct visual relationship of some kind between the two – a visual relationship which is more than remote or ephemeral, and which in some way bears on one's experience of the listed building in its surrounding landscape or townscape" (paragraph 56)".***
>
> ***Paragraph 26 – "This does not mean, however, that factors other than the visual and physical must be ignored when a decision-maker is considering the extent of a listed building's setting. Generally, of course, the decision-maker will be concentrating on visual and physical considerations, as in Williams (see also, for example, the first instance judgment in R. (on the application of Miller) v North Yorkshire County Council [2009] EWHC 2172 (Admin), at paragraph 89). But it is clear from the relevant national policy and guidance to which I have referred, in particular the guidance in paragraph 18a-013-20140306 of the PPG, that the Government recognizes the potential relevance of other considerations – economic, social and historical. These other considerations may include, for example, "the historic relationship between places". Historic England's advice in GPA3 was broadly to the same effect."*** [17]

When considering cases where impacts are associated with changes in 'setting' only, a recent Secretary of State Appeal Decision (henceforth referred to as the 'Edith Summerskill House Decision') has clearly set out that:

> ***"In cases where the impact is on the setting of a designated heritage asset, it is only the significance that asset derives from its setting that is affected. All the significance embodied in the asset itself would remain intact. In such a case, unless the asset concerned derives a major proportion of its significance from its setting, then it is very difficult to see how an impact on its setting can advance a long way along the scale towards substantial harm to significance."*** [18] (our emphasis)

Within the preceding paragraph of the Edith Summerskill House Decision the Inspector provides the following narrative on substantial harm and the less than substantial harm 'spectrum':

> ***"… substantial harm is set at a high bar, such that a good deal (or all) of the significance of a designated heritage asset would have to be removed for it to be reached. That means that the range for a finding of less than substantial harm is very wide indeed, from a harmful impact that is hardly material, to something just below that high bar."*** [19]

Levels of Significance

Descriptions of significance will naturally anticipate the ways in which impacts will be considered. Hence descriptions of the significance of Conservation Areas will make reference to their special interest and character and appearance, and the significance of Listed Buildings will be discussed with reference to the building, its setting and any features of special architectural or historic interest which it possesses.

---

[17] Catesby Estates Ltd. V. Steer [2018] EWCA Civ 1697, paras. 25 and 26.
[18] APP/H5390/V/21/327713 [2023] - Edith Summerskill House, Clem Attlee Court, London, SW6 7TW, Paragraph 12.5 of main Decision
[19] Ibid, Paragraph 12.4 of main Decision.

In accordance with the levels of significance articulated in the *NPPF* and the *PPG*, three levels of significance are identified:

- **Designated heritage assets of the highest significance,** as identified in paragraph 206 of the NPPF, comprising Grade I and II* Listed Buildings, Grade I and II* Registered Parks and Gardens, Scheduled Monuments, Protected Wreck Sites, World Heritage Sites and Registered Battlefields (and also including some Conservation Areas) and non-designated heritage assets of archaeological interest which are demonstrably of equivalent significance to Scheduled Monuments, as identified in footnote 72 of the NPPF;[20]

- **Designated heritage assets of less than the highest significance,** as identified in paragraph 206 of the NPPF, comprising Grade II Listed Buildings and Grade II Registered Parks and Gardens (and also some Conservation Areas);[21] and

- **Non-designated heritage assets.** Non-designated heritage assets are defined within the PPG as "*buildings, monuments, sites, places, areas or landscapes identified by plan-making bodies as having a degree of significance meriting consideration in planning decisions, but which do not meet the criteria for designated heritage assets*".[22]

Additionally, it is of course possible that sites, buildings or areas have no heritage significance.

Assessment of Harm

Assessment of any harm will be articulated in terms of the policy and law that the proposed development will be assessed against, such as whether a proposed development preserves or enhances the character or appearance of a Conservation Area, and articulating the scale of any harm in order to inform a balanced judgement/weighing exercise as required by the NPPF.

In accordance with key policy, the following levels of harm may potentially be identified for designated heritage assets:

- **Substantial harm or total loss.** It has been clarified in a High Court Judgement of 2013 that this would be harm that would "*have such a serious impact on the significance of the asset that its significance was either vitiated altogether or very much reduced*";[23] and

- **Less than substantial harm.** Harm of a lesser level than that defined above.

With regards to these two categories, the *PPG* states:

> ***"Within each category of harm (which category applies should be explicitly identified), the extent of the harm may vary and should be clearly articulated."***[24]

[20] DLUHC, *NPPF*, para. 206 and fn. 72.
[21] DLUHC, *NPPF,* para. 206.
[22] DLUHC, *PPG*, paragraph 039, reference ID: 18a-039-20190723.
[23] Bedford Borough Council v Secretary of State for Communities and Local Government [2013] EWHC 2847 (Admin), para. 25.
[24] DLUHC, *PPG*, paragraph 018, reference ID: 18a-018-20190723.

Hence, for example, harm that is less than substantial would be further described with reference to where it lies on that spectrum or scale of harm, for example low end, middle, and upper end of the less than substantial harm spectrum/scale.

With regards to non-designated heritage assets, there is no basis in policy for describing harm to them as substantial or less than substantial, rather the *NPPF* requires that the scale of any harm or loss is articulated whilst having regard to the significance of the asset. Harm to such assets is therefore articulated as a level of harm to their overall significance, using descriptors such as minor, moderate and major harm.

It is also possible that development proposals will cause no harm or preserve the significance of heritage assets. Here, a High Court Judgement of 2014 is relevant. This concluded that with regard to preserving the setting of a Listed building or preserving the character and appearance of a Conservation Area, "*preserving*" means doing "*no harm*".[25]

Preservation does not mean no change, it specifically means no harm. *GPA:2* states that "*Change to heritage assets is inevitable but it is only harmful when significance is damaged*".[26] Thus, change is accepted in Historic England's guidance as part of the evolution of the landscape and environment. It is whether such change is neutral, harmful or beneficial to the significance of an asset that matters.

As part of this, setting may be a key consideration. When evaluating any harm to significance through changes to setting, this Report follows the methodology given in *GPA:3*, described above. Fundamental to this methodology is a consideration of "*what matters and why*".[27] Of particular relevance is the checklist given on page 13 of *GPA:3*.[28]

It should be noted that this key document also states:

> ***"Setting is not itself a heritage asset, nor a heritage designation…"***[29]

Hence any impacts are described in terms of how they affect the significance of a heritage asset, and heritage interests that contribute to this significance, through changes to setting.

With regards to changes in setting, *GPA:3* states that:

> ***"Conserving or enhancing heritage assets by taking their settings into account need not prevent change".***[30]

Additionally, whilst the statutory duty requires that special regard should be paid to the desirability of not harming the setting of a Listed Building, that cannot mean that any harm, however minor, would necessarily require Planning Permission to be refused. This point has been clarified in the Court of Appeal.[31]

---

[25] R (Forge Field Society) v Sevenoaks District Council [2014] EWHC 1895 (Admin).
[26] Historic England, *GPA:2*, p. 9.
[27] Historic England, *GPA:3*, p. 8.
[28] Historic England, *GPA:3*, p. 13.
[29] Historic England, *GPA:3*, p. 4.
[30] Historic England, *GPA 3.*, p. 8.
[31] Palmer v Herefordshire Council & Anor [2016] EWCA Civ 1061.

Photographs

Photographs included in this Report are for illustrative purposes only to assist in the discussions of heritage assets, their settings, and views, where relevant. Unless explicitly stated, they are not accurate visual representations of the site or development proposals, nor do they conform to any standard or guidance i.e., the Landscape Institute Technical Guidance Note 06/19. However, the photographs included are intended to be an honest representation and are taken without the use of a zoom lens or edited, unless stated in the description or caption.

Appendix 2: Site Photographs.



Plate 1.1: View north across the modern golf course in the direct of Gaunt's Earthcott.



Plate 1.2: View northwest across the golf course demonstrating the modern form and character.



Plate 1.3: View southwest across the golf course demonstrating the modern form and character.



Plate 1.4: Grouping of buildings (modern and historic) at Manor Farm as seen from the south, demonstrating the level to which buildings surround the Farmhouse.



Plate 1.5: Grouping of buildings (modern and historic) at Manor Farm as seen from the southeast. The ridge/roof of Manor Farm Farmhouse is indicated by the blue arrow, with Green Farm to the northeast of the grouping indicated by the orange arrow.



Plate 1.6: Grouping of buildings (modern and historic) at Manor Farm as seen from the south, demonstrating the level to which buildings surround the Farmhouse and screen views to/from it.



Plate 1.7: Manor Farm Farmhouse as seen from the paddock to the east.



Plate 1.8: View in the direction of the Site from the paddock to the east of the Manor Farm Farmhouse (visible in the far righthand of the frame).



Plate 1.9: Manor Farm Farmhouse as seen from Gaunt's Earthcott Lane.



Plate 1.10: Court Farm as seen from the adjacent PRoW.



Plate 1.11: View towards the Court Farm complex from Gaunt's Earthcott Lane to the north.



Plate 1.12: Green Farm as seen from Gaunt's Earthcott Lane.



Plate 1.13: View west along Gaunt's Earthcott Lane in the vicinity of the entrance to the Court Farm complex and Green Farm.



Plate 1.13: View east along Gaunt's Earthcott Lane in the vicinity of Manor Farm.

•

Planning (Listed Buildings and Conservation Areas) Act 1990
Town & Country Planning Act 1990 (as amended)
Planning and Compulsory Purchase Act 2004

Bristol
First Floor, South Wing, Equinox North,
Great Park Road, Almondsbury, Bristol, BS32 4QL
T 01454 625945
E Bristol@pegasusgroup.co.uk
Offices throughout the UK.

Expertly Done.

DESIGN | ECONOMICS | ENVIRONMENT | HERITAGE | LAND & PROPERTY | PLANNING | TRANSPORT & INFRASTRUCTURE

Pegasus Group is a trading name of Pegasus Planning Group Limited (07277000) registered in England and Wales.
Registered office: 33 Sheep Street, Cirencester, GL7 1RQ
We are **ISO** certified **9001**, **14001**, **45001**

Pegasus_Group pegasusgroup Pegasus_Group

PEGASUSGROUP.CO.UK

grassroots
PLANNING

Grass Roots Planning Ltd
Suites 9 & 10
Bristol North Baths
Gloucester Road
Bristol
BS7 8BN
t: 0117 930 0413 grassroots-planning.co.uk

Grass Roots Planning Ltd

[redacted]

Planning Policy – Department for Environment and Community Services
South Gloucestershire Council
PO Box 1954
Bristol
BS37 0DD

Our Ref: 354/A3/CC/MK
19th October 2020

Dear Sir / Madam,

SOUTH GLOUCESTERSHIRE COUNCIL 'CALL FOR SITES' 2020: WOODLANDS GARDEN VILLAGE, NORTH BRISTOL

On behalf of [redacted] Grass Roots Planning has been instructed to prepare and submit the above land in the 'Call for Sites' currently being undertaken by South Gloucestershire Council to support their new Local Plan and the wider Spatial Development Strategy (SDS) now being prepared by the West of England Combined Authority (WECA).

It was announced by the WECA in July 2020 that a new SDS would be prepared jointly between Bristol City, South Gloucestershire, and Bath and North-East Somerset Councils, and in partnership with North Somerset Council, to plan the future of the region over the next twenty years.

Whilst we acknowledge that this is intended to be a 'high level' strategic document which will not allocate specific sites, it is our view that the strategy for the WECA should be to promote growth on the edge of Bristol where demand is greatest, after reasonable brownfield site opportunities have been explored for re-development purposes. Following this, development should be delivered in settlements which are already sustainable, with small-scale need being met in more rural areas where it is required.

We consider that this is the most sustainable option to deliver growth for the region, reduce carbon emissions and leverage off existing infrastructure which is already available and extend it without significant costs.

The issues with the previous West of England Joint Spatial Plan (WoE JSP)

As officers will be aware, the JSP was withdrawn from examination in January 2020, following receipt of the Inspectors' report in August 2019 which deemed the plan to be 'unsound' for a number of reasons.

This was largely related to the evidence base prepared in support of the plan and the lack of a clear, iterative selection process for the Strategic Development Locations identified to meet the Region's needs.

The main issues with the evidence base prepared were as follows:

- Mitigation was included at earlier stages to produce conclusions for certain Strategic Development Locations (SDLs) but not for the alternatives, meaning there was no clear, consistent or objective evidence base that compared those options;
- This led to an unsustainable selection of sites proposed as SDLs which had mitigation measures included in their assessment of suitability resulting in an inflated Sustainable Appraisal (SA) score;
- The SA predated much of the evidence base prepared and therefore could not realistically have informed the process, and in effect was justifying decisions on site selection already made prior to detailed assessment work;
- The alternatives set out in the SA were not appraised to the same level as the preferred options put forward;
- Updated and detailed evidence prepared by third parties submitted as part of the various consultation stages of the JSP was ignored;
- The authorities claimed that the strategy was based on focusing development on transport corridors yet when looking at the region as a whole it appeared that development was evenly distributed and did not focus on such corridors that offered existing public transport provision, only those where it was thought such provision could be provided as mitigation, if funding for such improvements could be secured; and
- As a result, an inappropriate selection of sites were chosen which did not respond to the needs of the region and would have produced an unsustainable pattern of development.

Thus, a fresh approach to the distribution of development, in line with a high level-spatial strategy based on sound evidence, is required. We urge the authorities to approach the new SDS with a fresh outlook and not simply prepare new evidence to justify a pre-determined strategy similar to the JSP.

The basis for concentrating development at Bristol

In preparing the new spatial plan and the new Local Plan for South Gloucestershire the authority will need to consider the priorities for the region in order to achieve economic prosperity and growth, which in our view should be the following:

- Deliver homes where demand is greatest and supply is already outstripped, to try and balance the amount of homes available on the market and reduce house price inflation;
- Lower carbon emissions by reducing car usage involved in travelling to work or school, with easy and safe options available to travel via walking, cycling and public transport;
- Protect areas which have strong environmental designations, for example Areas of Outstanding Natural Beauty, World Heritage Sites, or Flood Risk Zones;
- Secure long-term certainty for the expansion of significant employment, distribution and industrial areas, such as the established employment areas of the Northern Fringe of Bristol, Avonmouth, the Port, and the Airport;
- Ensure local centres have sufficient outdoor provision in order to accommodate a range of uses; and
- Provide small-scale development in rural areas to help sustain local facilities and services.

We consider that the best way of achieving the above priorities is by distributing the highest levels of development around Bristol where demand for housing is highest, and house price inflation most acute, followed by existing towns and cities where there is already existing sustainable transport provision available to the core cities of Bristol and Bath (i.e. sustainable transport corridors); and after this, we consider that small-scale development in rural areas should be incorporated within the strategy to respond to local needs and support existing services.

During the preparation of the JSP evidence base, it was acknowledged by the authorities that *'avoiding the Green Belt in its entirety would result in an unsustainable pattern of development forming'.* We agree with this assertion and suggest that a new assessment of Green Belt land should be undertaken which results in

sustainably located Green Belt land being released for allocation. In our view, protection of the Green Belt, for its sake alone, when it is only a *'servant of sustainable development'* (I.M. Properties Development Limited v Lichfield District Council [2015] EWHC 2017 (Admin)) means that it should not be seen as sacrosanct nor its release minimised as an overriding priority, particularly if public access to it can be improved.

The Government's 'Planning for the Future' paper infers that land can continue to be assessed and released from the Green Belt as part of a Local Plan process, and allocated for development where housing need requires. Any Green Belt land release on the edge of Bristol can be compensated for by the allocation of new Green Belt land further out if that is required.

As set out within our submissions to the JSP consultations and Hearings, had the authorities assessed the different spatial scenarios correctly as part of the Sustainability Appraisal work they would have found one to be demonstrably more sustainable then the others – the 'Concentration at the Bristol Urban Area'.

Our assessment of this issue is presented below, which simply took the council's own assessment and applied a straightforward numeric weighing system to it:

Type of Spatial Scenario	Sustainability Objective																				Total Score
	1a	1b	1c	2a	2b	2c	2d	2e	2f	3a	3b	4a	4b	4c	4d	4e	4f	4g	4h	5a	5b	
Protection of GB	+/-	+/-	+/-	++	+	+/-	+/-	+/-	+?	0	+/-	-?	--	+/--?	++/--?	++/--?	-	-	-	+/-	+?	4
	1	1	1	4	2	1	1	1	2	-1	1	-2	-4	-3	1	1	-2	-2	-2	1	2	
Concentration at Bristol urban area	+	+/--	++?	++	+	++?	++?	++	++?	0	++	--?	--	--?	--?	--?	-	--	0	+	+?	5
	2	-3	4	4	2	4	4	4	4	-1	4	-4	-4	-4	-4	-4	-2	-4	-1	2	2	
Transport Focussed	+	+/-	+	++	+	+	+	+	+?	0	+/-	--?	--	--?	--?	-?	-	-	-	++	+?	1
	2	1	2	4	2	2	2	2	2	-1	1	-4	-4	-4	-4	-2	-2	-2	-2	4	2	
More even spread of development	+/--	--	--	++	+	--	--	+/--	+?	0	--	--?	--	--?	--?	--?	-	--	-	--	-?	-50
		-4	-4	4	2	-4	-4	-3	2	-1	-4	-4	-4	-4	-4	-4	-2	-4	-2	-4	-2	
New settlements	+?	+/--	+/-?	++	+	+/-?	+/-?	+/-	+?	0	+/-?	-?	?	--?	--?	--?	-?	--?	?	+/--	+?	-10
	2	-3	1	4	2	1	1	1	2	-1	1	-2	0	-4	-4	-4	-2	-4	0	-3	2	

The South Gloucestershire Council Local Plan 2020 'Phase 1 – Consultation Document' also alludes to this approach being the most sustainable. It refers throughout the document that decarbonising transport by planning for growth so that people can access key services and facilities is extremely important for responding to climate change and reducing carbon emissions, and acknowledges that a review of the Green Belt is required.

Accordingly, it is clear that in order to achieve sustainable patterns of development, the majority of need should be concentrated at the Bristol Urban Area and a review of the Green Belt should be undertaken to release land suitable to accommodate growth in this location.

Land at Woodlands Golf Club

As we have set out in many previous representations to the JSP process, we consider that land at Woodlands Golf Club (and the north of Bristol in general) is the most sustainable option for delivering development in the WECA region; particularly development that will meet need arising from Bristol City itself.

The West of England Joint Transport Local Plan 2020 – 2036 highlights the key issues associated with transport in the region. The summary of transport challenges includes the following:

- 2 out of 3 people currently commute by car;
- There will be a £6bn shortfall in transport funding;
- Over 300 premature deaths a year are linked to NO2 emissions;
- 1 in 11 people commute via public transport;
- Transport is the largest contributor to greenhouse gas and CO2 emissions;
- 2 in 5 commutes are less than 2km; and
- £300m annual cost of congestion.

Placing development in areas close to existing employment and facilities where residents are able to walk, cycle or use public transport instead of driving, is key to addressing the above challenges.

Allocating land at Woodlands Club for a development of circa 2,000 dwellings would go a significant way to addressing these issues. This is because the site lies in proximity to existing transport and employment hubs, including Bristol Business Park, Aztec West, and the Metrobus, which are all significant in terms of reducing people's travel to work. Whilst it is acknowledged that the COVID-19 crisis will result in changes to our travel patterns, studies are showing currently that people are likely to continue with a 'blended' option: working from home on some days and travelling to the office for others.

The work undertaken by Vectos in support of our representations shows that Woodlands Golf Club had the most amount of jobs available within a reasonable commuting distance (i.e. under a 2km walk, a 5km cycle or a 'commuter' cycle of 8km), compared to the SDLs that were being selected at the time. It was also one of the few sites where the Metrobus could have been extended albeit the existing bus stops were already within walking distance. It therefore seems logical to accommodate development in this location to encourage the use of this infrastructure which has cost millions to implement.

One of the key issues raised during the consultation process was the potential impact of the development on Junction 16 of the M4/M5. In response, we undertook significant transport modelling to ascertain the impact of development in this location and introduced key transport measures as part of the scheme.

This is summarised as follows:

- 2,000 dwellings provided at Woodlands would generate 654 additional traffic movements in the AM peak (08:00-09:00) and 795 in the PM peak (17:00-18:00). These are worst-case figures that do not allow for the fact that the current site use generates traffic and the site is highly accessible via foot and cycle which will mean that because of modal shift to these forms of alternative transport that the figures modelled are conservative in the extreme.
- Delivering a potential spine road through the site to Hortham Lane would provide benefits not only in respect to alleviating the impact of the Woodlands development but also for existing residents of the local area by reducing congestion in the Almondsbury Interchange area by providing an alternative route in the direction of Thornbury to the north. This potential route has been modelled and would not result in any significant impact on the A38/Hortham lane junction.
- Detailed modelling of the scheme shows (prior to any form of mitigation) the overall impact on the modelled network is minimal.
- An assessment of the impact on greenhouse gas emissions between Woodlands and the previously identified SDL at Buckover was undertaken and demonstrated that the proposals at Woodlands would generate nearly 2.5 million grams (2.5 tonnes) less CO2 gases than the Buckover development would over the 3-hour AM and PM peak period.
- Slight impacts were identified from the development including an increase in queuing and delay at the Woodlands Lane/Bradley Stoke Way Junction in the AM peak hour and the A38/M5 junction during the PM peak period. However, this can be mitigated through physical works that can be funded by the development and these measures are discussed further below.

As part of the detailed design work undertaken the following measures have been incorporated into the layout and enhancements proposed to ensure that the site will be sustainable and accessible:

- A new bridge will be provided across the M4 to the south of the site to allow widening of the existing road and segregation of cyclists and pedestrians from the main flow of traffic on the new bridge;
- New bus link to be provided through the site and all dwellings to be located within 400m of a bus stop;
- Extensive walking and cycling routes to be provided throughout the site and integrated into existing infrastructure to the north and south;

- Key everyday facilities such as convenience shopping, primary school and nursey all provided as part of a local centre;
- Implementation of a travel plan including measures to increase take-up of public transport (for example, bus vouchers);
- Sustrans and a Bus Operator are already engaged and working on schemes to further enhance the accessibility of the site and Sustrans have prepared a robust and costed scheme to radically improve cycle links in the north of the city. [redacted] are committed to funding the majority of these improvement works;
- An additional approach lane to the A38 northbound approach to the M5 / A38 junction has been proposed to address the minor impacts on the queuing times in this area;
- An additional entry lane at the A38 northbound approach to the junction and amendments to the southbound approach to include three lanes which are signal controlled and a fourth lane which will function as a bypass has been proposed; and
- The nearside lane along the M5 between J16 and J15 would be reinstated.

Any development would not be reliant on these measures because the modelled impacts have been found to be so small; however the mitigation proposed would offer wider benefits which the applicant would be willing to deliver as part of the Woodlands scheme. If implemented these measures would actually improve the local highways network in the PM peak.

The impact of COVID-19 has also reduced the amount of pressure on the highways network by around 10%, according to latest studies. As such, the above figures and measures are very much a worse-case scenario and it has been demonstrated that Woodlands Garden Village would have minimal impact in highways terms.

Landscape and Impact on the Green Belt

Whilst we acknowledge that there are many facets to sustainable development, it is our view that the forefront of this should be to reduce carbon emissions from travel by the private car, given the climate change emergency adopted in South Gloucestershire, and in light of the challenges highlighted by the Joint Local Transport Plan 4 which was adopted earlier this year.

However, we acknowledge that there are other considerations including the impact on local landscape and the associated Green Belt designation. During the JSP process we also undertook extensive landscape assessment work. Our consultants Liz Lake Associates identified that the man-made earthworks and other features associated with the golf course means it has a different appearance to the rest of the area and is not typical of its character; furthermore the existing topography and vegetation on the site and around its boundaries generally screens it from surrounding viewpoints. Accordingly, it was determined to make a limited contribution to the landscape character of the area and the proposed masterplan incorporates the recommendations made by Liz Lake to ensure there would be no adverse impact on landscape. We would recommend that officers review the work submitted at this time to address this constraint, if this is unavailable please let us know and we would be happy to provide electronic or hard copies.

With respect to the Green Belt designation, again our previous work included an assessment of how the site meets the objectives of the Green Belt and we would refer officers to our previous representations. However, a summary is provided below for ease of reference:

- We have determined that the site is highly visually enclosed but accessible in respect to the services and facilities already present in Bristol. We therefore do not consider that development here would contribute to the unrestricted sprawl of the city;
- There are no historic towns nearby of which the setting needs to be preserved nor are there any neighbouring towns nearby in which the development of the site would contribute towards coalescence;

- Any development in the Green Belt would undermine the safeguarding of the countryside, however, as our previous evidence set out, the land at Woodlands Garden Village is physically and visually well-contained so its impact on views of the countryside are much less than other sites;
- Lastly, we are not aware of any large-scale brownfield redevelopment sites that could fulfil Bristol's strategic development requirements. Moreover, it is the position of the WECA that even after brownfield sites have been exhausted, there is a requirement for the release of greenfield land, this is even clearer now the government has launched revisions to the Standard Method of calculating housing requirements which indicate that the region housing requirement should increase from circa 115,000 dwellings over a 20 year plan period to just under 160,000, obviously a significant change.

Consequently, we consider that the site does not contribute significantly to the overriding priorities of the Green Belt and its release from this designation would result in a suitable and sustainable allocation for circa 2,000 dwellings, local centre, and significant parkland being delivered in close proximity to existing transport and employment hubs.

Progress to Date

Our previous representations to the JSP have included significant technical work to demonstrate that the site is feasible and the masterplan work proposed to date is deliverable. [redacted] are committed to providing the proposed mitigation outlined in our reports and the layout is continuing to evolve as work progresses. An updated brochure that sets out the site credentials is enclosed and shows the extent of development envisaged, which has changed from previous iterations to address evolving ecology and drainage work.

We have also enclosed copies of the previous technical work undertaken in support of our representations to the JSP, in relation to highways, landscape and Green Belt issues, ecology, and drainage.

Conclusions

As set out, we consider that land at Woodlands Golf Club should be allocated either as a high-level general location for growth / development, and / or as a specific allocation in a future SDS or Local Plan. The land is one of the most sustainable options for strategic-scale growth available adjacent to Bristol's existing urban area, being located in close proximity to existing employment and transport provision, as well as facilities and services for meeting everyday needs.

We have summarised the key issues within this letter but would refer officers to our previous representations made as part of the JSP process as well as technical work undertaken to establish the constraints and opportunities at the site. We have enclosed hard copies with this letter for ease of reference.

We look forward to discussing this site with officers in due course – should you wish to discuss this in any way, my contact details are available at the top of this letter.

Yours sincerely

[redacted]

MATTHEW KENDRICK
Director

WOODLANDS GARDEN VILLAGE

Vision Document

October 2020

Contents

01	THE VISION	...03
02	KEY BENEFITS	...04
03	INTRODUCTION	...05
04	THE NEED FOR A GARDEN VILLAGE	...07
05	SITE CONTEXT	...09
06	ENVIRONMENTAL CONTEXT	...12
07	CONCEPT MASTERPLAN	...16
08	DESIGN PRINCIPLES	...18
09	FRAMEWORK MASTERPLAN	...19
10	INSPIRATION	...21
11	DELIVERABILITY	...22
12	SUMMARY	...23

01

The Vision

"WOODLANDS GARDEN VILLAGE WILL BE AN EXEMPLARY FORM OF SUSTAINABLE DEVELOPMENT, A PLACE WHERE PEOPLE WILL WANT TO LIVE, WORK AND PLAY. UNDERPINNED BY THE CORE VALUES OF THE GARDEN CITY PHILOSOPHY, IT WILL ENCOURAGE A SHIFT TOWARDS SUSTAINABLE TRAVEL OPTIONS, BE INCLUSIVE FOR ALL USERS AND LEAD THE WAY IN HIGH QUALITY DESIGN".

02 Key Benefits

A golden opportunity to deliver **1,750 homes** in a location where demand is greatest - Bristol

At least **612** dwellings out of 1,750 will be **affordable homes**

It will provide **excellent commuting routes** to work via walking and cycling, minimising the need to travel

£1m will be provided towards improvements to **SUSTRANS infrastructure** for walking and cycling

The site is viable and deliverable - **works could begin immediately** subject to planning permission

The site is viable and can be delivered entirely through private funding alone, with **no need for Government grants**

Proposed **extension to existing bus routes** - residents will also be located within easy walking distance of Metrobus

Innovative housing delivery models can be explored - such as **off-site construction, custom and self-builds**

Relieve congestion from J16 of the M5 and a new through-route will provide an alternative link to Thornbury

A large **network of parkland including pitches** will be provided for recreation and sport, with woodland enhanced for **new habitat creation**



03 Introduction

3.1 Woodlands Garden Village will be an exemplary form of sustainable development, a place where people will want to live, work and play. Underpinned by the core values of the Garden City philosophy, it will encourage a shift towards sustainable travel options, be inclusive for all users and lead the way in high quality design.

3.2 The key objectives that the development will adopt include:

- **Create a walkable neighbourhood** which provides easy access to not only new on-site facilities but also existing ones, including schools, bus routes and extensive job opportunities already available within the adjacent north Bristol fringe;
- **Establish a green-space network of travel routes,** tree-lined avenues, ponds, pocket parks, trim trails, and woodland, encouraging an active lifestyle through walking and cycling;
- **Incorporate allotments and community orchards,** to promote active and healthy lifestyles;
- **Educational provision** will encourage active learning for children and young adults through the allocation of suitable land and design of new educational facilities;
- **Deliver high quality housing for all** (including self-build, custom build, starter and affordable housing), providing beautifully designed, functional and adaptable homes. In particular sufficient room to work from home will be provided. Character areas will be varied and take cues from the best parts of the local context, whilst also responding in imaginative ways to the National Design Guide published by the Government in 2019;
- **Create safe places and vibrant public areas,** so that all users will feel comfortable and relaxed;
- **Deliver a mix of uses within the heart of the community** to provide opportunities for businesses to grow, for retail to thrive and for restaurants and pubs to flourish, with a focus on start-up businesses; and
- **Ensure that biodiversity net gains are achieved** across the development, by creating an extensive and diverse range of new habitats, including wetlands, woodlands, wildflower meadows and new hedgerow networks.



04 The Need for a Garden Village

4.1 South Gloucestershire Council, working with Bristol City and Bath & North-East Somerset Council (known as the West of England Combined Authority or WECA), and in partnership with North Somerset Council, are producing a Spatial Development Strategy (SDS) which will plan for the strategic development needed in the region over the next twenty years.

4.2 There is a need to plan at a regional level to accommodate the existing acute demand for new housing and jobs that the region experiences. Such long term planning will increase economic growth and prosperity in the region, and foster a sense of community and reduce the need to travel via private car by encouraging the use of public transport, walking and cycling.

4.3 Both 'Planning for the Future' published by the MHCLG in August 2020 and the current COVID-19 pandemic will significantly shape the future of planning and how we adapt to the changes brought about by these events.

4.4 'Planning for the Future' proposes a new 'standard method' for determining housing need. Whilst the official figures are yet to be published, applying the formula is fairly straight forward. By doing this it is evident that the Region will be expected to deliver the following levels of housing growth:

Authority	Current Local Plan Requirement (per annum)	Current Standard Method (per annum)	Proposed New Standard Method
Bristol	1,320	2,368	2,490
South Gloucestershire	1,360	1,412	2,544
Bath and North East Somerset	720	648	1,216
North Somerset	1,049	1,365	1,708
TOTAL PER ANNUM	**4,449**	**5,793**	**7,958**
TOTAL OVER 20 YEARS	**88,980**	**115,860**	**159,160**

4.5 This is a significant level of development which requires a complete step change in the pace and scale of delivery when compared to past trends. Such development needs to be planned for properly, with infrastructure at the forefront of the proposals. This not only needs to consider roads, green spaces, and social and economic facilities, but should also reflect on the wider aspects of how we live. The COVID-19 pandemic has brought to light significant issues with our existing infrastructure: the inability of existing homes to adapt to the needs of those working from home, including a lack of domestic office space, super-fast broadband and private or communal outdoor space; and the security of our food sources.

4.6 In our view, a thorough review of potential land within the Green Belt is needed on the edge of Bristol, where demand is greatest. Land should be allocated within the Green Belt where there are already existing transport connections and employment provision.

4.7 **However, given the extent and immediacy of Bristol's needs, which cannot be met within the Bristol City administrative boundaries, we believe that development at Woodlands Garden Village could come forward earlier to meet the critical need for homes and provide significant benefits in the short term to help the economy recover from the adverse effects of the pandemic.**

4.8 The Joint Spatial Plan concluded that there was a need to release Green Belt land when planning for the housing figures set out in the third column of the above table - given the higher levels of growth now required there is an even more compelling case to release Green Belt land to address housing requirements without delay.

4.9 A new Garden Village is a sustainable way of delivering much needed housing, jobs, and infrastructure, as opposed to piecemeal development on the edge of smaller towns and villages where the existing infrastructure cannot cope with demand, and / or there are limited facilities, resulting in an increase in private car demand and associated carbon emissions.

Almondsbury

Hortham Hospital development

M5

the site

Woodlands

Aztec West

73

Bradley Stoke

T1

M1

Bradley Stoke Way

Trench Lane

M4

1km

M1 to City Centre

T1 to City Centre

73 to City Centre

Patchway

M1 to Cribbs Causeway

73 to Cribbs Causeway

T1 to Cribbs Causeway

Stoke Gifford

Facilities Plan

- The Site
- Existing Development
- Commercial Development
- Public Open Space / Sports Facilities
- Main Roads
- Secondary Roads
- Railway
- Closest Bus Routes and Stops
- Closest Pedestrian Routes
- Cycle Route
- Primary School
- Secondary School
- Food Store
- Post Office
- Health Facilites
- Sports Facilities and Bradley Stoke Leisure Centre
- Public House
- Employment

05 Site Context

5.1 The site sits on the edge of Bristol, adjacent to the major employment areas of Woodlands Business Park and Aztec West that both provide hundreds of job opportunities. It is also linked with Bradley Stoke, which provides a range of everyday facilities including superstores, a shopping centre, education provision and leisure centre. As such, there are already a significant number of services within walking and cycling distance and we have investigated how key active travel routes can be improved as part of the proposed development. It is therefore hoped that Woodlands Garden Village can provide opportunities for more organic growth of smaller independent businesses, services and leisure providers, as more generic larger-scale retail facilities are already available in the local area.

5.2 The site is also close to existing bus routes which could easily be extended to provide faster links to UWE, Bristol Parkway Railway Station and the centre of Bristol; this includes the Metrobus route which runs close to the southern boundary of the site and provides a regular, fast and reliable service.

5.3 Delivering additional housing in this location will increase usage of this flagship service and underpin its financial viability, which is extremely important given the recent capital investment involved in its delivery.

5.4 Woodlands Garden Village therefore presents an excellent opportunity to create a sustainable development set within a landscape-led, high quality environment, that reduces the need to travel via the private car and increases the ability to travel via walking, cycling and public transport.

5.5 **Importantly, the development can fund its own infrastructure delivery, including a new through-road that will take the pressure off Junction 16 of the M5 by providing an alternative route from the Bristol North Fringe to Thornbury. The site is not reliant on Government funding and can be delivered immediately and entirely through private funding alone.**



05 Site Context

5.6 Whilst there are some limited full-time members, Woodlands Golf Course is generally a ‘pay and play’ facility, which gives the opportunity to obtain a Fairway Membership without the commitment of a joining fee or annual subscription.

5.7 We have however looked at how the full-time members may be re-distributed to other clubs, as well as considering those who utilise the site on a pay and play basis.

5.8 Nationally, golf participation has decreased from nearly 900,000 people playing golf a minimum of once a week in 2006, to less than 730,000 by 2016. Many golf clubs in the UK are struggling to recruit members and instead are having to diversify their income to keep the club viable by promoting functions such as weddings.

5.9 Over the last few years we have contacted golf clubs in the Bristol area to ascertain the numbers of members they have and identify how many members they believe they could retain prior to reaching full capacity. Whilst some clubs were unwilling to give out information due to confidentiality, the majority confirmed that they have spare capacity and were actively trying to recruit new members to ensure they remained viable.

5.10 We are therefore confident that, should Woodlands Golf Course be utilised for development, there would be alternative, viable options available for existing members to be re-distributed to a club in the local area. The club would of course help existing members to transfer and provide details of other available clubs to join.

THORNBURY

CHIPPING SODBURY

FILTON

KENDLESHIRE

SHORTWOOD

KINGSWOOD

KNOWLE

BATH

ALTERNATIVE GOLF CLUBS FOR WOODLANDS MEMBERS

Woodlands Golf Club

Alternative Golf Clubs Available

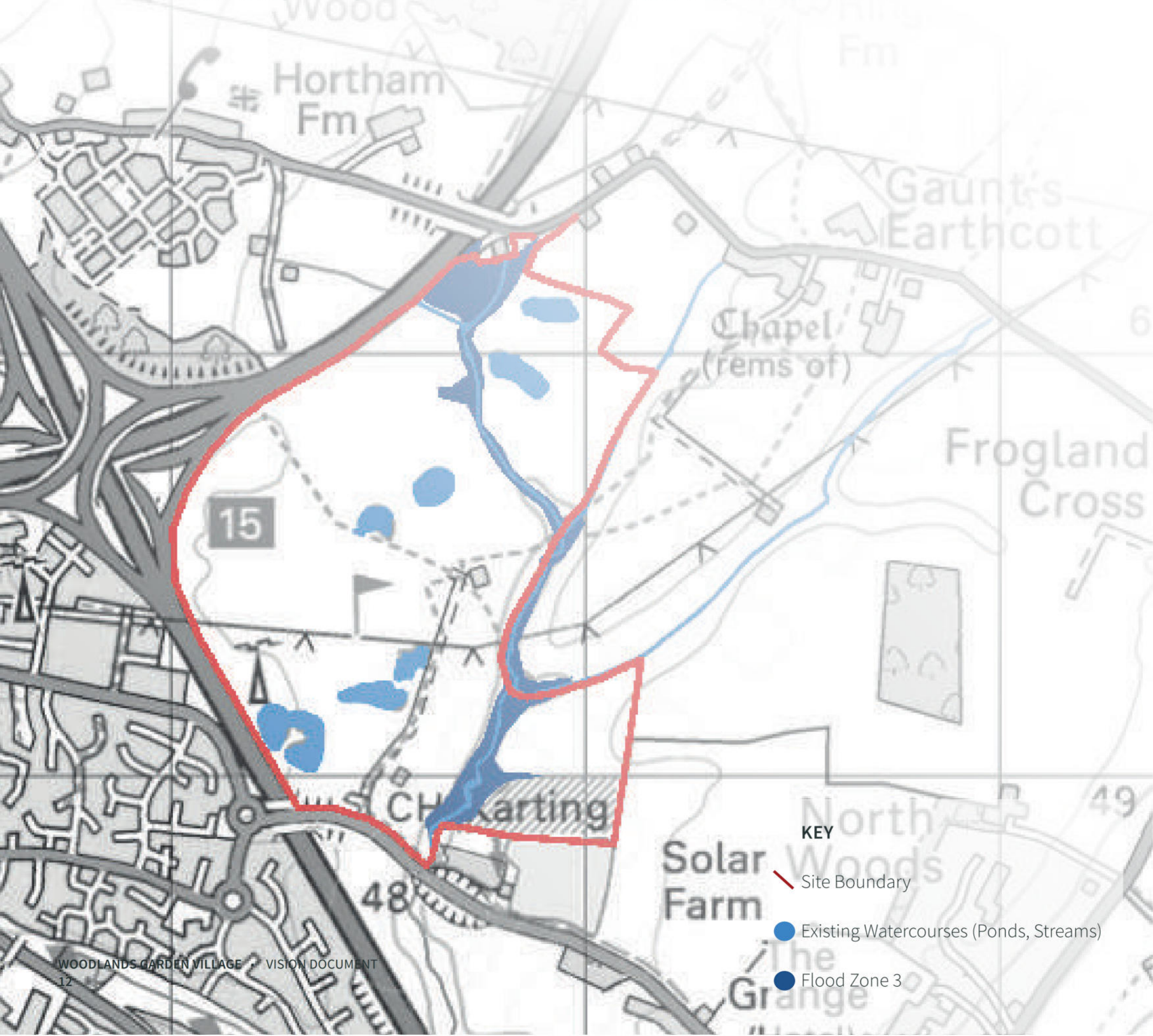
06 Environmental Context

FLOOD RISK & DRAINAGE

6.1 The site lies within Flood Zone 1, with the exception of small areas that lie adjacent to Hortham Brook, which lies in Flood Zones 2 and 3, defined by the Environment Agency as areas prone to fluvial flooding. There are also some minor surface water flow paths within the site, which correspond to drainage channels and ponds that currently serve the existing golf course.

6.2 **These existing features have been integrated into a proposed Sustainable Urban Drainage Strategy (SUDS), which will be designed to achieve pre-development run off rates (i.e. the surface water running off the site must leave at the same rate it did prior to the development being built). Then we will also include an allowance for climate change (roughly 40% over-engineered).**

6.3 The existing flood risk and drainage context would therefore not present a constraint and would be integrated into the development. The existing surface water features can also help create areas of biodiversity and help set an attractive landscaped character to any development here.



06 Environmental Context

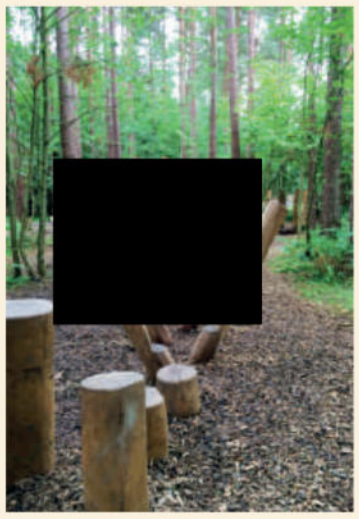
LANDSCAPE

6.4 The site is visually contained as it is surrounded by existing woodland and large-scale landscaped earthworks which were delivered as part of the golf course. The golf course itself, while attractive in parts, is not representative of the landscape character of the area and large parts of it are sterile, being close-cut grass that make up the greens and fairways of the course.

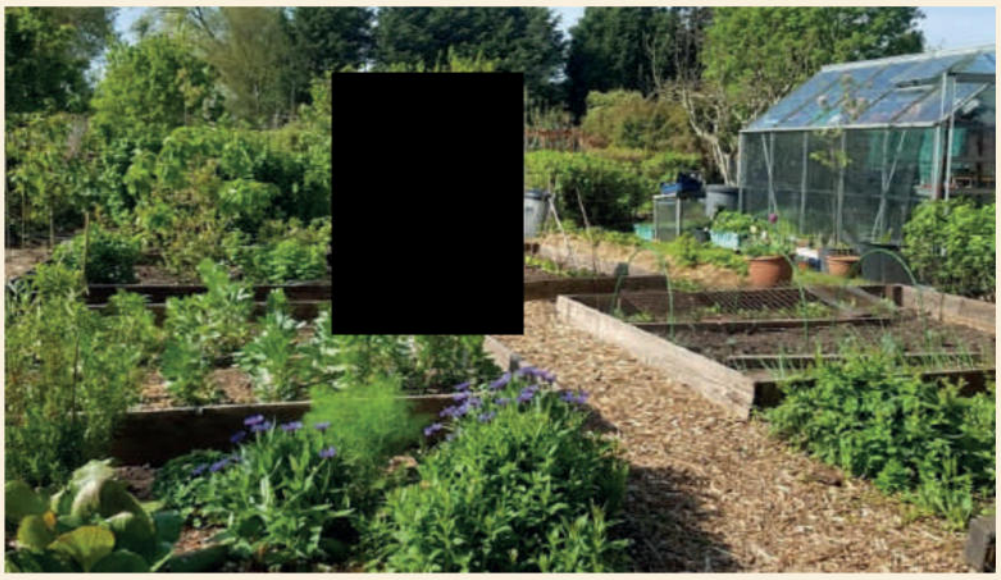
6.5 The proposed masterplan for the development has taken into consideration the landscape and visual impact of the development and its character, which has resulted in a landscape-led approach being adopted.

6.6 This includes providing a large swathe of multi-functional green space around the perimeter of the site with the retention of woodland blocks, provision of 'green fingers' of new woodland, and tree-lined avenues through the developable part of the site to provide further screening and connectivity. Formal and informal play space, trim trails, exercise areas, much needed playing pitches, allotments, community orchards, and ecological habitat will also be incorporated.

















06 Environmental Context

TRANSPORT

6.7 Woodlands Garden Village is located on the edge of Bristol, adjacent to both the M5 and M4 and therefore the strategic highways network, providing links to the south-west, north and east towards London. The primary access will be formed off Trench Lane, with additional access provided from Hortham Lane / Gaunt's Earthcott Lane to the north.

6.8 Due to the site's current use as a golf course the topography is extremely favourable for walking and cycling. The design of the community will incorporate active travel routes (including space for cyclists and pedestrians) as a key feature providing different routes dependent on the purpose (i.e. leisure or commuting). Dedicated cycle parking for all local facilities and individual residential properties will be provided.

6.9 **Focus will be given on working from home, particularly following the COVID-19 pandemic. The layout of Woodlands Garden Village will provide adequate office space in individual homes, ensure that small-scale office 'hub' facilities are located close by (most likely within the local centre), making it possible to undertake errands during lunch-breaks, and incorporate green spaces nearby to promote an active lifestyle and improve mental health.**

6.10 Interlinking the new development with the existing road network has been thoroughly considered since the outset of the proposals in 2016. The key objectives are to:

- Provide a new bridge across the M4 to the south of the site, to allow widening of the existing road and to provide a new separate bridge to allow for the segregation of cyclists, pedestrians and public transport from the main traffic flow. This will improve the experience of travelling to / from work in the existing employment areas;
- Incorporate a new bus link through the site, with all dwellings to be located within 400m of a bus stop. Discussions with a local bus operator are already taking place to work on schemes to do this;
- Extend walking and cycling opportunities throughout the site – Sustrans has prepared a robust and costed scheme to radically improve cycle links in the north of the city and the development will fund these;
- Provide key everyday facilities within a local centre which is easily accessible for everyone;
- Relieve congestion on the Almondsbury Interchange by providing an alternative route to Thornsbury through the site, delivering an additional approach lane to the A38 northbound approach to the M5 / A38 junction, as well as amendments to the southbound approach to include a fourth lane to function as a bypass when required;
- Consider how infrastructure should be future-proofed, for example providing space for automated deliveries and infrastructure for electric car and bike charging; and
- Implement a Travel Plan that reduces reliance on the private car and promotes walking, cycling and using public transport.

6.11 These measures would be set out in any application for the development or alternatively could be secured as part of a future allocation within the new Local Plan.

06 Environmental Context

SUSTAINABILITY & ENERGY EFFICIENCY

6.12 In 2019, South Gloucestershire Council declared a Climate Emergency in light of the growing concerns over climate change and the need to reduce carbon emissions.

6.13 Firstly, in spatial terms providing development in a location where residents can easily walk or cycle to work, and access shops and other facilities by these means, will reduce the development's impact on the environment when compared to other more peripheral locations being considered.

6.14 **Woodlands Garden Village also has the capability of being low carbon in terms of energy usage.** This will be achieved firstly by reducing the overall energy demand of the development through 'fabric-first' measures that can go beyond the requirements of Building Regulations; secondly through on-plot generation such as solar panels; and thirdly by generating as much renewable energy as possible within the site boundaries, which is possible due to the extensive amount of land available for such purposes.

6.15 The design of the new dwellings, and commercial and community structures, will play an important role in determining future energy requirements, and it is within everyone's interests to make sure that the demand for energy and carbon footprint is minimised as far as possible. To secure this, the development would be connected to a Sustainable Construction Design Code which would achieve the following:

- Plot layout and fenestration to maximise solar gain and control;
- Maximise opportunities for natural ventilation;
- Efficient fabric performance and maximisation of form factor to minimise external walls;
- On-plot renewable energy and heat generation (Solar PV and Heat Pumps);
- On-plot electric vehicle charging points;
- LED lighting and Smart Controls;
- Low impact materials and waste recycling for construction;
- Water efficient appliances and fittings;
- Planting for biodiversity, water retention in soils and habitat creation; and
- Recycling facilities both within the home and communally.

6.16 Whilst solar generation is likely to provide a significant amount of energy to serve the development's needs, other options are being explored to incorporate renewable sources of energy, such as heat pumps, microgrid systems, small-scale hydro electric power on the brook which runs through the site, Combined Heat Source Power or a biomass facility.

6.17 This provision would ensure that the Woodlands Garden Village would be highly sustainable in terms of energy generation and overall carbon footprint.



07 Concept Masterplan

7.1 The concept masterplan provides a tool that demonstrates how the site might be developed to meet the established Vision. Further technical work has shaped the proposals and they will continue to evolve up to the submission of a planning application for the site.

7.2 Design Codes will also be produced to ensure that the established principles are adhered to in future development proposals for different parts of the site.

7.3 As can be seen, green infrastructure is an integral part of the design of the proposals and this is extensive across the site, shown on the western, eastern and northern boundaries in particular, incorporating existing ponds and lakes which form part of the golf course. This will be multi-function green space and opportunities will be taken to enhance the existing wildlife corridors.

7.4 A hierarchy of roads is shown with a range of multi-modal links, which will foster use of sustainable transport methods, including walking, cycling and public transport. In particular, this separates users, by providing more recreational routes for leisure purposes, whilst creating direct routes for those commuting to and from work.

7.5 **A local centre has been provided that will incorporate a number of everyday uses, including a convenience store, restaurants, school, office space, care village, and nursery – where appropriate, this will include sufficient outdoor space so that these businesses can continue to operate effectively when it might not be possible to do so indoors.**

7.6 Woodlands Garden Village will therefore provide a comprehensive and exemplary form of sustainable development, fostering economic growth, providing a net gain in biodiversity, integrating landscape and reducing carbon emissions through the promotion of sustainable travel.

07 Concept Masterplan



08 Design Principles

8.1 Woodlands Garden Village will be comprehensively planned and phased, ensuring that infrastructure will be delivered in a timely fashion alongside residential properties.

8.2 Key design principles are to be established to ensure there is a robust framework for creating a cohesive development which will be built to high design standards. These principles include:

- **Encourage sustainable travel** – walking, cycling, and using public transport will be safe, convenient and practical travel choices;
- **Enhance Green Infrastructure** – by establishing a network of green routes for different purposes, tree-lined avenues, multi-functional green spaces, and ecological habitat for both people and wildlife;
- **Support active and healthy lifestyles** – through the provision of allotments and orchards as well as walking and cycling routes;
- **Deliver high quality housing and development** – through high density residential and mixed-use areas on public transport corridors, with lower densities moving outwards to reflect the semi-rural edge and meet different housing needs (i.e. self-build, larger family homes, bungalows, etc.);
- **Foster a sense of community** – through provision of everyday services and facilities, providing opportunities for start-up companies, grass-roots organisations and leisure; and
- **Achieve adaptability** – by integrating future-proofed infrastructure for homes and within the layout of the village.

8.3 By applying the above principles to the site, and by building on the concept plan, we have produced a more detailed framework plan as shown overleaf, which demonstrates how the site could be successfully developed to meet Our Vision.

09 Framework Masterplan



09 Framework Masterplan

9.1 The Framework masterplan builds on the concept masterplan and the Design Principles set out previously.

9.2 The masterplan strategy includes the following notes which demonstrates how this is being achieved:

ACCESS

01 Main Access to the site from Trench Lane and Gaunt's Earthcott Lane, creating a new strategic urban connection which is well-enclosed by the development.

02 Secondary or emergency access is possible from Trench Lane.

03 Public Right of Way (pedestrian route) across the site retained within a green infrastructure corridor and serving to connect the existing and new communities towards strategic footpath networks to the north of the site.

04 New on-site pedestrian routes utilise existing shingle trails associated with the golf course and provide circular walks and leisure routes.

05 A hierarchy of streets creates a legible residential environment. This includes main and secondary streets, shared surface areas and loops within development parcels, creating a highly accessible environment.

06 Buildings address Public Open Space (POS) with shared space / private drive frontage to promot quiet streets. All green spaces have frontages overlooking them to provide natural surveillance.

LANDSCAPE

07 Joined up Green Infrastructure network including formal and informal recreation areas, children's play, allotments and ecological areas / Sustainable Urban Drainage Systems (SUDs). A number of circular walks are available within the GI network.

08 Historic field boundaries, some still incorporating planting, have been retained to create additional green infrastructure corridors or avenues within the development with reference to local landscape character and ecological habitat / connectivity.

09 A dense landscape edge is proposed to the northern and eastern boundaries based on existing and enhanced woodland. This boundary includes hedgerow planting with trees and a shared pedestrian / cycle path.

10 The built form to the northern site boundary re-defines the urban edge. Existing hedge planting is proposed to be enhanced with trees, to help integrate devlopment and allow filtered views into/out of the site.

11 Linear habitat creation to create wildlife corridors is intended through the site, in association with the proposed road infrastructure / drainage features / watercourses / retained hedgerows.

12 The potential to upgrade existing cycle and pedestrian infrastructure immediately adjacent to the site boundaries.

COMMUNITY

13 Two-form entry primary school close to development focus within the centre of the site.

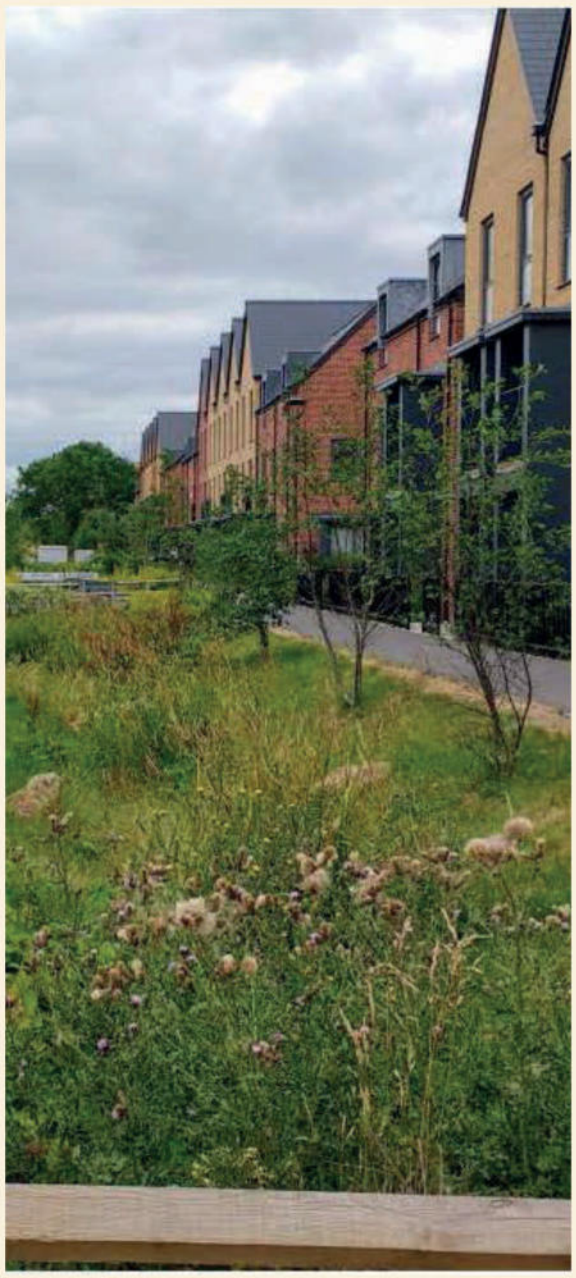
14 Local Centre within the middle of the site.

15 Public Open Space includes allotments as well as equipped childrens' play areas.

16 Proposed commuter cycle route including on and off road sections within the development and providing a strategic cycle connection to Bradley Stoke.

10 Design Inspiration







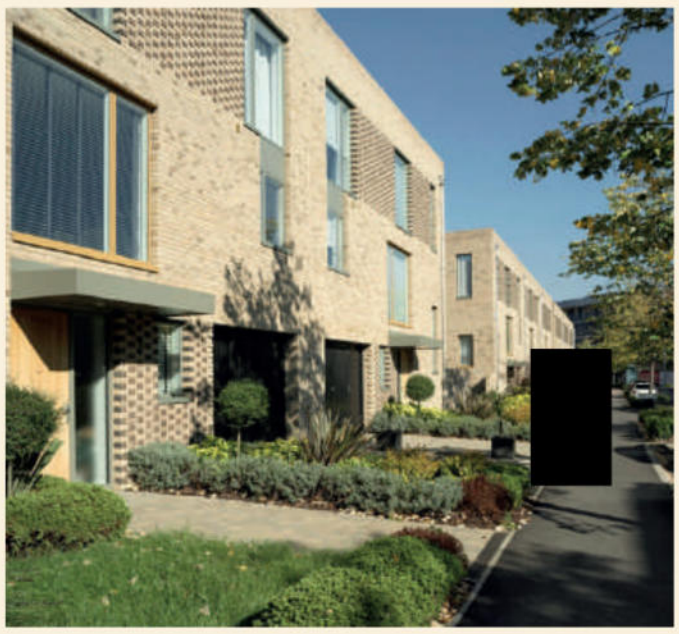


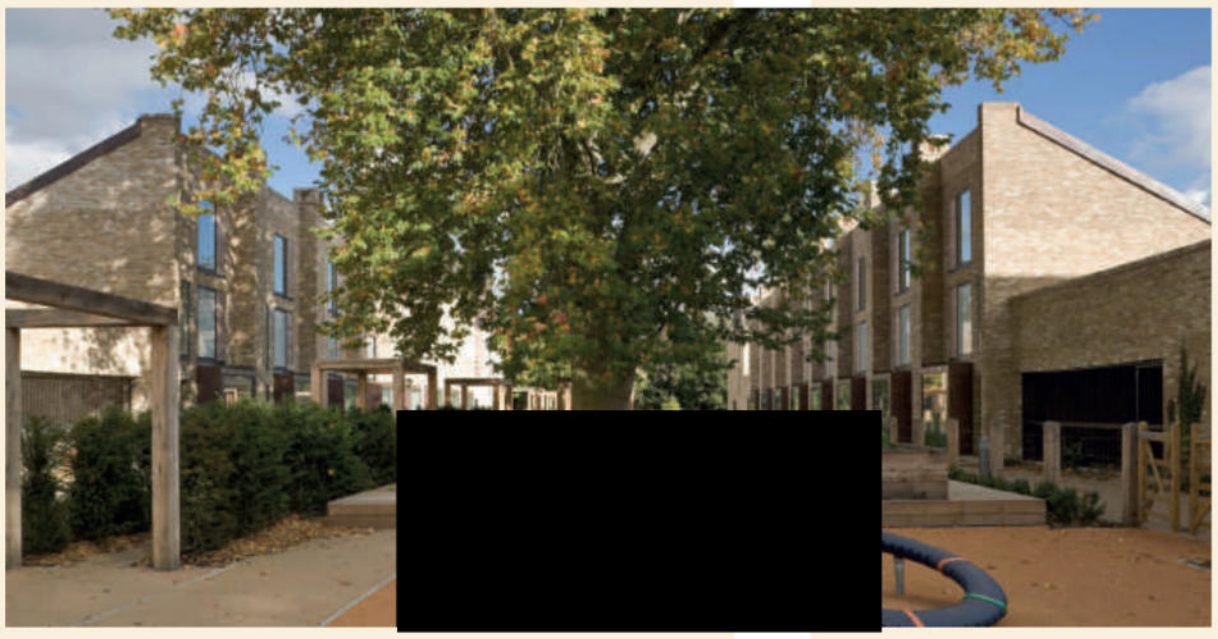












11 Deliverability & Viability

11.1 Woodlands Garden Village provides an opportunity to deliver sustainable development to respond to the demand for housing (including affordable homes) and jobs growth in the WECA region, which is predominantly focused on Bristol itself, where house price inflation has been highest. In our view, this is the most appropriate solution after brownfield regeneration opportunities have been identified – particularly as this site lies on the urban edge of Bristol and can synergise with existing facilities and employment areas in the city, a number of which are directly adjacent to the site, such as Woodlands and Aztec West Business Parks.

11.2 WECA previously concluded that Green Belt land would be required to meet development needs across the region. Since this time, the need in Bristol has risen further and affordability issues have become more acute, it is therefore our view that Woodlands can help meet an immediate need through securing planning consent, as well as being allocated in a future Local Plan.

11.3 The site is within [redacted] has an agreement with [redacted] to promote the site for development. [redacted] has been sensitive to ensure that their agreement allows it to financially provide for the infrastructure that is required to make this scheme exemplar. This means that the community benefits promised can be delivered.

11.4 The land is not subject to any significant physical limitations or constraints associated with infrastructure, and the scheme can be designed easily to accommodate flood risk and drainage, transport, ecology, landscape, noise, and other constraints. This means that delivery can occur quickly, subject to planning permission.

11.5 **[redacted] is committed to providing the appropriate infrastructure to encourage sustainable development and has taken into account the costs for this; for example, the provision of a new bridge across the M4 has been fully costed and can be provided as part of the first phase of the development, with no Central Government or other funding sources being required.**

11.6 The general location of the site is known to be attractive to developers and there is a high demand for housing on the edge of Bristol in particular. This means that if development is allocated or permitted here, it will be delivered speedily.

11.7 Woodlands Garden Village is therefore deliverable and viable, in accordance with the National Planning Policy Framework (NPPF) and National Planning Practice Guidance (NPPG).

12 Summary

12.1 Woodlands Garden Village represents an excellent opportunity to create a dynamic and exemplary development, comprising a combination of new neighbourhoods with character whilst being linked to the existing urban area of Bristol, where there is already ample provision for employment and everyday facilities.

12.2 The site can provide for a mix of uses as shown in the emerging concept layout, which also incorporates extensive amounts of green space which will be multi-functional, accessible and inclusive, as well as enhancing biodiversity value.

12.3 It will also seek to reduce its carbon footprint as far as possible through the provision of renewable energy sources, energy efficiency, and reducing the need to travel, enabling working from home and ensuring everyday facilities are in proximity to be able to undertake errands and socialise.

12.4 The proposals will also exhibit high quality design, based on the 'Building Better, Building Beautiful' campaign and the Government's National Design Guidance published in 2019.

12.5 Given the high levels of need in the WECA region, development is required now, in the Green Belt, to address acute issues of affordability. Whilst there is a need to plan effectively via the Local Plans process, we are of the view that an early application in this location would benefit the local housing market (including meeting the need for affordable homes) and economy as there are limited constraints to the site which means it can be delivered early.

12.6 As such, Woodlands Garden Village will create a 'sense of place' with a strong identity and character, representing sustainable development and meeting the needs of the WECA region over the next twenty years.



WOODLANDS • GARDEN • VILLAGE

PREPARED BY:

Grassroots



Air Quality Assessment for the proposed development at the Land at Woodlands Golf Club

Report to Grass Roots Planning Ltd

January 2018

Title	Air quality assessment for the proposed development at the Land at Woodlands Golf Club
Customer	Grass Roots Planning Ltd
Recipient	Grass Roots Planning Ltd
Report Reference	AQ_assessment/2018/Woodlands_Golf_Club
Report Status	Version 1
Revisions	None
File	Aether_AQ_assessment_Woodlands_Golf_Club

Author(s)	Rosie Brook
Reviewed by	Melanie Hobson
Signature	[redacted]
Date	5th January 2018

Company Details:	Aether Ltd Oxford Centre for Innovation New Road Oxford OX1 1BY UK Registered in England 6630896
Contact:	enquiries@aether-uk.com +44(0)1865 261466 www.aether-uk.com

Contents

1 Introduction 1
1.1 The Location of the Development 1
1.2 Assessment Criteria 2
1.3 Local Air Quality Management 3
1.4 The ADMS-Roads Method 3
2 Methodology 4
2.1 Local Pollutant Concentrations 4
2.1.1 Local monitoring data 4
2.1.2 Background mapped data 5
2.2 Traffic data 5
2.3 Model input data 6
2.4 Conversion of NO_x to NO_2 9
2.5 Model Verification 9
3 Results 9
3.1 Results of the Dispersion Modelling 9
3.2 Significance 12
3.3 Mitigation Measures 13
3.4 Mitigating the Impacts of the Construction Phase 14
4 Summary and Conclusions 15
Appendix A – Model Verification 16
Appendix B – Traffic Data 17

1 Introduction

Aether has been commissioned by Grass Roots Planning Ltd to undertake an air quality assessment for the proposed re-development of the existing Woodlands Golf Club (115.2 ha) in Almondsbury BS32 4JZ. The development will consist of the creation of residential dwellings with associated car parking spaces. At present, it is not expected that air pollutant emitting on-site energy generation will be included in the development.

The development falls within South Gloucestershire District Council (SGDC), which suffers from elevated levels of air pollution, primarily due to high levels of traffic. It is therefore important to assess whether there will be an exceedance of the air quality objectives for particulate matter (PM_{10}) or nitrogen dioxide (NO_2) at the proposed site and then advise whether any action is required to reduce the residents' exposure to air pollution. The assessment utilises ADMS-Roads, a comprehensive dispersion modelling tool for investigating air pollution problems due to small networks of roads and industrial sources.

The expected completion date of the proposed development is 2030. The assessment has therefore been completed for 2031, the expected first full year of occupation.

1.1 The Location of the Development

The proposed development is located adjacent to the M4/M5 junction (**Figure 1**).

Figure 1: Location of the development site



1.2 Assessment Criteria

A summary of the air quality objectives relevant to the South Gloucestershire development, as set out in the UK Air Quality Strategy[1], is presented in **Table 1** below.

Table 1: UK Air Quality Objectives for NO_2 and PM_{10}

Pollutant	Concentration	Measured as
Nitrogen Dioxide (NO_2)	40 µg/m^3	Annual mean
	200 µg/m^3	Hourly mean not to be exceeded more than 18 times per year (99.8th percentile)
Particulate Matter (PM_{10})	40 µg/m^3	Annual mean
	50 µg/m^3	24 hour mean not to be exceeded more than 35 times a year (90.4th percentile)

The oxides of nitrogen (NO_x) comprise principally of nitric oxide (NO) and nitrogen dioxide (NO_2). NO_2 is a reddish brown gas (at sufficiently high concentrations) and occurs as a result of the oxidation of NO, which in turn originates from the combination of atmospheric nitrogen and oxygen during combustion processes. NO_2 can also form in the atmosphere due to a chemical reaction between NO and ozone (O_3). Health based standards for NO_x generally relate to NO_2, where acute and long-term exposure may adversely affect the respiratory system.

Particulate matter is a term used to describe all suspended solid matter, sometimes referred to as Total Suspended Particulate matter (TSP). Sources of particles in the air include road transport, power stations, quarrying, mining and agriculture. Chemical processes in the atmosphere can also lead to the formation of particles. Particulate matter with an aerodynamic diameter of less than 10 µm is the subject of health concerns because of its ability to penetrate deep within the lungs and is known in its abbreviated form as PM_{10}.

Further information on the health effects of air pollution can be found in the reports produced by the Committee on the Medical Effects of Air Pollutants[2].

As defined by the regulations, the air quality objectives for the protection of human health are applicable:

- Outside of buildings or other natural or man-made structures above or below ground
- Where members of the public are regularly present.

Using these definitions, the annual mean objectives will apply at locations where members of the public might be regularly exposed such as building façades of residential properties, schools and hospitals and will not apply at the building façades of offices or other places of work, where members of the public do not have regular access. The 24 hour objective will apply at all locations where the annual mean objective would apply together with hotels. Therefore in this assessment the annual mean and 24 hour mean objectives will apply at all floors of the residential development. The hourly objective

[1] The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007), Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland

2 https://www.gov.uk/government/collections/comeap-reports

will apply at all locations where members of the public could reasonably be expected to spend that amount of time. Therefore, in this assessment the hourly objective will also apply at all levels of the development.

1.3 Local Air Quality Management

Local authorities are required to periodically review and assess the current and future quality of air in their areas. Where it is determined that an air quality objective is not likely to be met, the authority must designate an Air Quality Management Area (AQMA) and produce an Air Quality Action Plan (AQAP).

SGDC has three active AQMA[3] declared due to exceedances of the annual mean NO_2 objective. The sites; Cribbs Causeway, Kingswood – Warmley and Staple Hill do not cover the development location. The houses on the opposite side of M4 from the development site are not covered by an AQMA and therefore the proposed development site is not expected to be in exceedance as it is located a similar distance from the motorway. An AQAP was produced in 2012[4], this sets out local measures aimed at improving air quality within the Kingswood and Staple Hill AQMAs.

1.4 The ADMS-Roads Method

Local air quality has been assessed using ADMS-Roads, a comprehensive dispersion model that can be used to predict concentrations of pollutants in the vicinity of roads and small industrial sources. The model has been used for many years in support of planning applications for new residential/commercial developments.

ADMS-Roads is able to provide an estimate of air quality both before and after development, taking into account important input data such as background pollutant concentrations, meteorological data, traffic flows and on-site energy generation (if applicable). The model output can be verified against local monitoring data to increase the accuracy of the predicted pollutant concentrations and this approach has been followed in this assessment.

The use of dispersion modelling enables estimates of concentrations to be made at varying heights. As a result, suggestions for appropriate mitigation measures can be mareareade where necessary, taking into consideration the identification of worst-case locations.

The most recent version of ADMS-Roads (v4.1) was issued in February 2017 and requires the following information to assess the impact at sensitive receptor locations:

- **Setup:** General site details and modelling options to be used
- **Source:** Source dimensions and locations, release conditions, emissions
- **Meteorology:** hourly meteorological data
- **Background:** Background concentration data
- **Grids:** Type and size of grid for output
- **Output:** Output required and sources/groups to include in the calculations.

[3] https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=238
[4] http://aqma.defra.gov.uk/action-plans/south-glos-air-quality-action-plan-march-2012.pdf

2 Methodology

2.1 Local Pollutant Concentrations

It is good practice to include up-to-date local background pollutant concentrations in the assessment model, and also to verify modelled outputs against local monitoring data where available. This section provides an overview of the local data available for use in the assessment.

2.1.1 Local monitoring data

SGDC has one automatic site which monitors nitrogen dioxide (NO_2) and particulate matter (PM_{10}). Unfortunately, this site lies more than 8 km from the development site. NO_2 concentrations are also measured passively at diffusion tube sites across the District. Two of these diffusion tube sites lie within close proximity (< 500 m) of the development site. Details of the monitoring sites near to the development site are given in **Table 2**.

Monitoring results have been provided by the Council[5]. No nearby monitoring of PM_{10} is available from SGDC.

Table 2: Monitoring sites within 500 m of the Woodlands Golf Club development

Site Name	Site Type	Pollutant(s)	Grid Reference	Distance to Kerb (m)	Approx. Distance to development site (m)
DT 34	R	NO_2	362395, 182544	24.8 (M4 33)	340
DT 35	R	NO_2	362118, 183031	3.3 (M4 22.5)	190

Note: R = roadside

The diffusion tubes were analysed by Somerset County Council Scientific Services, who participate in the Proficiency scheme[6]. Whilst diffusion tubes provide an indicative estimate of pollutant concentrations, they tend to under or over read. The data is therefore corrected using a bias adjustment factor. There are two types of bias adjustment factor – local and national. The local factor is derived from co-locating diffusion tubes (usually in triplicate) with automatic monitors, whereas the national factor is obtained from the average bias from all local authorities using the same laboratory. SGDC has applied a national bias adjustment factor (0.88) to their 2016 diffusion tube results.

Monitoring results are presented in **Table 3**. The data shows that no exceedances of the annual mean NO_2 objective have occurred at either of the nearby diffusion tube sites in the past three years. Diffusion tubes do not provide information on hourly exceedances, but research[7] identified a relationship between the annual and 1 hour mean objective,

[5] Received via email from Sally Radwell, South Gloucestershire District Council on 04/12/2017. At the time of completing this report, the 2017 ASR was not publicly available. Other South Gloucestershire District Council air quality reports can be found at: http://www.southglos.gov.uk/environment-and-planning/pollution/pollution-control-air-quality/air-quality-reports/

[6] This is a national QA/QC scheme.

[7] As described in Box 5.2 of LAQM Technical Guidance (TG16).

such that exceedances of the latter were considered unlikely where the annual mean was below 60 µg/m^3. Therefore, it is considered highly unlikely that exceedances of the 1 hour mean objective occurred at the DT 34 or DT 35 monitoring sites between 2014 and 2016.

Table 3: Monitoring results for sites close to the proposed development site, 2014-2016

Objective	Site Name	2014	2015	2016
Annual mean NO_2 (µg/m^3)	DT 34	32	29	31
	DT 35	32	28	32

2.1.2 Background mapped data

Background pollutant concentration maps are available from the Defra LAQM website[8] and data has been extracted for SGDC for this assessment. These 2015 baseline, 1 kilometre grid resolution maps are derived from a complex modelling exercise that takes into account emissions inventories and measurements of ambient air pollution from both automated and non-automated sites.

The estimated mapped background NO_x, NO_2 and PM_{10} concentrations around the development site are 29.2 µg/m^3, 20.5 µg/m^3 and 15.5 µg/m^3 respectively in 2016 (the baseline year used in the assessment). The background maps also provide projections to future years. For 2030 (the last year available in the background maps), the concentrations obtained for the same pollutants are 16.2 µg/m^3, 12 µg/m^3 and 14.9 µg/m^3 respectively.

Due to the lack of a nearby urban background monitoring site, the 2016 mapped background concentrations have been used in this assessment. To provide a conservative estimate, the projected improvements in background air quality by 2030 have not been used in the dispersion modelling.

2.2 Traffic data

Average annual daily traffic (AADT) count data for 2016 (the selected baseline year) has been obtained for the M4 and M5 from Department for Transport (DfT) Traffic Counts[9], which provides data for major roads. Traffic count data for Trench Lane and Hortham Lane were provided in the Transport Assessment[10]. In the absence of any other data being available for all other minor roads, estimates are based upon average values for an 'urban minor road, South West' from the DfT National Road Traffic Survey, 2017[11].Therefore there will be uncertainty in the model input. All roads within 200 metres of the modelled receptors have been included in the assessment. The values are shown in Appendix B.

For the purpose of this assessment, it has been assumed that the flows in traffic increase by 25.7 % between 2016 and 2031. This is based on the 5 year average annual change on the M4. It is possible to use the RTF[12] model to project traffic growth; however, this is

[8] http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html
[9] http://www.dft.gov.uk/traffic-counts
[10] [redacted] Land at Woodlands Golf Course, Transport Study, August 2017. Vectors. Traffic counts were provided for peak flows and converted to AADT using the time variant profile,
[11] http://www.dft.gov.uk/statistics/series/traffic/
[12] http://laqm.defra.gov.uk/documents/RTF-Automated-Traffic-Growth-Calculator-v3-1.xls

only available up until 2025. A similar growth rate is predicted between 2016 and 2025 using both methods (14.7 % and 12.0 %, respectively) giving confidence in the assumption.

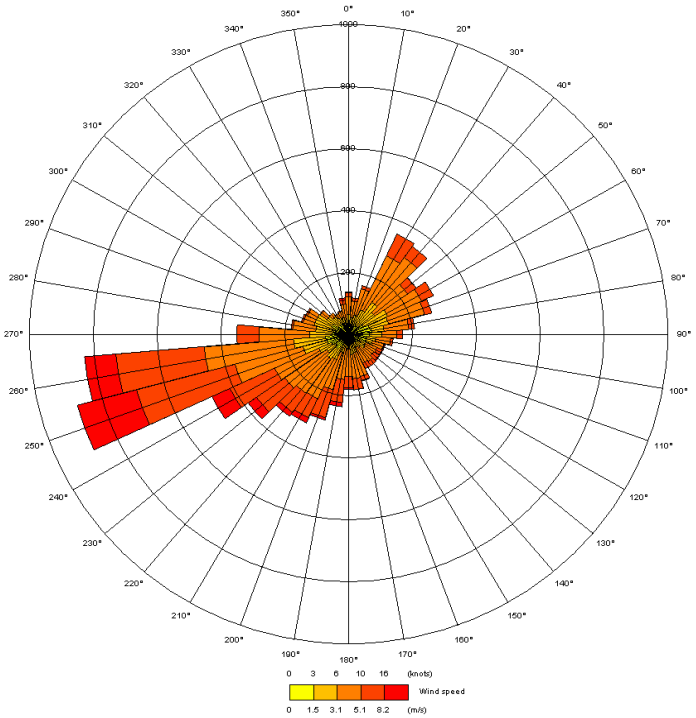
The Transport Assessment concludes that the development will result in a maximum of 3,195 additional daily vehicular trips during peak hours in 2036. It has been assumed that the same increase in traffic applies in 2031, the development year. The applied time variant factor profile[13] has been used to converted this to total additional daily vehicular trips. The resulting estimated increase in daily car trips (7,547) has been taken into account in the assessment for roads with direct access to the site with development in 2031. Results (**Section 3** of this report) therefore refer to concentrations modelled in 2031 both without and with the proposed development.

In the absence of any other data being available, average speeds on local roads have been assumed based on the speed limit.

2.3 Model input data

Hourly meteorological data from Bristol (Filton) for 2016 has been used in the model. The wind-rose diagram (**Figure 2**) presents this below.

Figure 2: Wind-rose diagram for Bristol meteorological data, 2016



[13] TRA0307: https://www.gov.uk/government/statistical-data-sets/tra03-motor-vehicle-flow

Figure 3: Road sources and receptors



Contains Ordnance Survey data © Crown copyright and database right [2018]

ArcMap software has been used to model the road source locations (red lines) that are within 200 metres of the receptor locations (blue circles). This data can then be automatically uploaded to ADMS-Roads. This generates an accurate representation of the surrounding area to be assessed in the model in terms of the length of roads and distances between sources and receptors. This is shown in **Figure 3** above. It is assumed that the contribution of other sources to NO_2 and PM_{10} is included in the background concentrations.

Six sensitive receptor locations have been selected for the assessment:

- A: north eastern extent of the development
- B: outdoor play area, located close to Hortham Lane and the M5
- C: northern side of the development, located closest to the M5
- D: north western extent of the development, located closest to the M4/ M5 junction

- E: eastern side of the development, located closest to the M4
- F southern extent of the development, located closest to Trench Lane

These sites have been chosen to reflect the extremities of the site and their proximity to road traffic sources. The architect's plans (**Figure 4**) show the development site in more detail with receptor locations highlighted (blue circles). An assessment is made for the receptors at varying heights to assess likely concentrations across floor levels. Exposure has been assumed to be represented at the mid-point of each floor. In addition, two residential receptors have been selected to assess the impact of the development on current local residents:

- R1: representing the concentrations of the property on Gaunt's Earthcott Lane closest to the development
- R2: representing the concentrations of the property on Hortham Lane closest to the M5

Figure 4: The location of the receptors used in the modelling



2.4 Conversion of NO_x to NO_2

Recent evidence shows that the proportion of primary NO_2 in vehicle exhaust has increased[14]. This means that the relationship between NO_x and NO_2 at the roadside has changed from that currently used in the ADMS model. A NO_x to NO_2 calculator (Published in October 2017)[15] has therefore been developed and has been used in conjunction with the ADMS model to obtain a more accurate picture of NO_2 concentrations.

2.5 Model Verification

Model verification refers to checks that are carried out on model performance at a local level. This involves the comparison of predicted versus measured concentrations. Where there is a disparity, the first step is to check the input data and the model parameters in order to minimise the errors. If required, the second step will be to determine an appropriate adjustment factor that can be applied.

In the case of NO_2, the model should be verified for NO_x as the initial step and should be carried out separately for the background contribution and the source (i.e. road traffic). Once the NO_x has been verified and adjusted as necessary, a final check should be made against the measured NO_2 concentration.

For this project, modelled annual mean road-NO_x estimates have been verified against the concentrations measured at the DT 34 and DT 35 diffusion tube sites (see **Appendix A**). These sites were selected as they are the only monitoring sites located within 500 m of the development site and are located a similar distance from the M4 as the eastern side of the development. Ideally three verification sites would have been used, but no other sites were deemed suitable due to their distance from the development site.

The adjustment factor determined for annual mean NO_x concentrations was also applied to the modelled annual mean PM_{10} concentrations. This was done as no PM_{10} monitoring data that is representative of the development site is available from SGDC, and this approach was considered more appropriate than not applying any adjustment.

3 Results

3.1 Results of the Dispersion Modelling

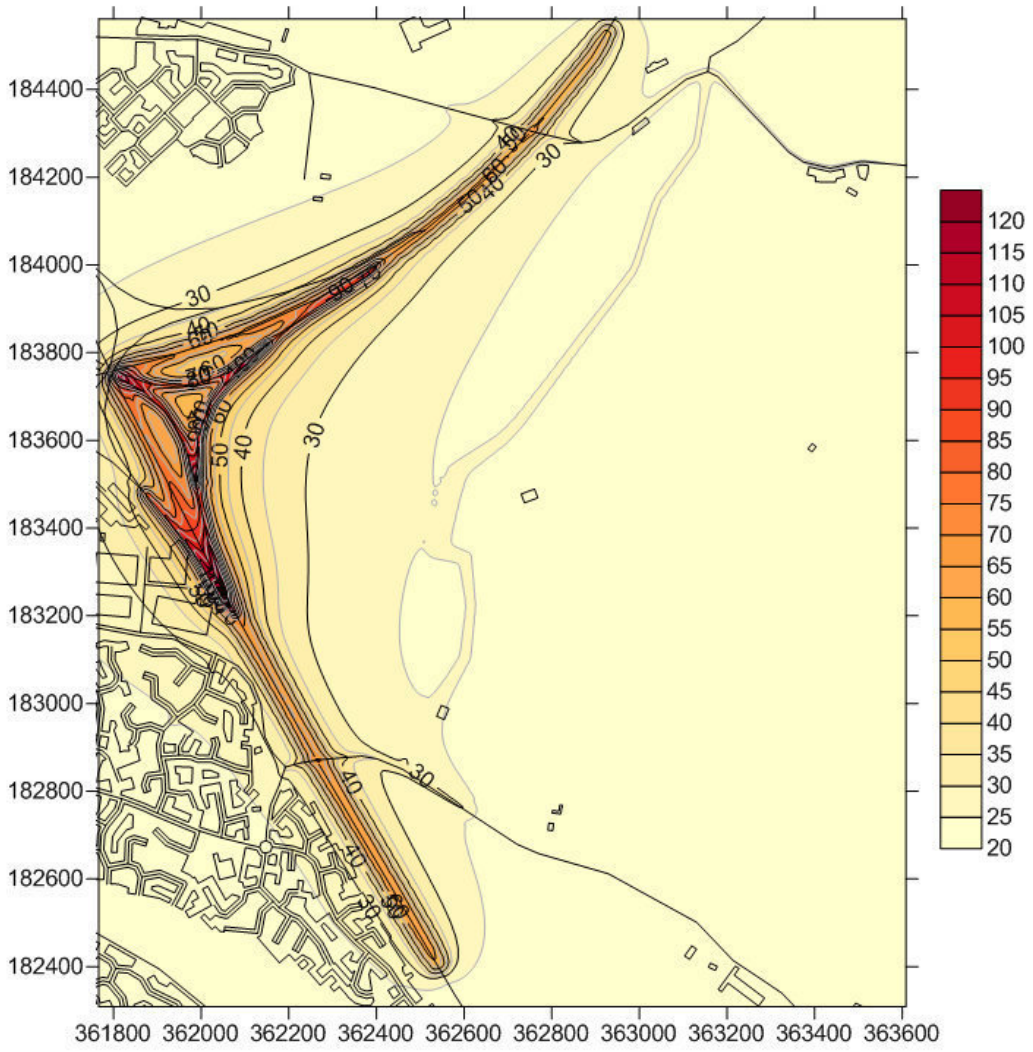
Table 4 below provides the estimated pollutant concentrations in the base year (2016) and the development year (2031) without and with[16] development. **Figure 5** below presents the estimated pollutant concentrations in the development year (2031) with the development. Given the inherent uncertainties in the modelling, background pollutant concentrations and vehicle fleet emission factors have been maintained at 2016 levels in the development year scenarios to provide a conservative estimate. Traffic growth has been predicted using the recent trends on the M4.

[14] http://uk-air.defra.gov.uk/assets/documents/reports/aqeg/primary-no-trends.pdf
[15] https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOXNO2calc
[16] 'With' development includes the impact of the additional traffic that will be generated with the development

Table 4: Estimated pollutant concentrations in 2031 without and with the development ($\mu g/m^3$)

Floor level	Receptor	Annual mean NO_2 concentration ($\mu g/m^3$)			Annual mean PM_{10} concentration ($\mu g/m^3$)			NO_2 Change without vs. with development	PM_{10} Change without vs. with development
		2016	2031 Without development	2031 With development	2016	2031 Without development	2031 With development		
Ground	A	22.5	23.0	24.2	15.7	15.7	15.9	1.2	0.2
	B	26.6	28.1	28.6	16.1	16.2	16.3	0.5	<0.1
	C	26.6	28.2	28.2	16.1	16.2	16.2	<0.1	<0.1
	D	33.2	36.3	36.3	16.7	17.0	17.0	<0.1	<0.1
	E	26.9	28.5	28.6	16.1	16.2	16.3	<0.1	<0.1
	F	26.0	27.3	28.7	16.1	16.2	16.5	1.4	0.2
Residential receptors									
Ground	R1	21.8	22.1	23.1	15.6	15.7	15.8	1.1	0.2
	R2	23.3	24.0	25.0	15.8	15.8	16.0	1.0	0.2

Figure 5: Estimated annual mean NO_2 concentrations with development in 2031 ($\mu g/m^3$)



In the without development scenario, the model predicts annual mean NO_2 concentrations to be below (by > 9 %) the annual mean objective at all locations. The worst-case location is identified as receptor D which is located closest to the M4/ M5 junction, where roadside concentrations will be maximised.

The estimated annual mean NO_2 concentrations at the development site are reasonable when compared to the data collected at the DT 34 and DT 35 monitoring sites. The 2016 monitored concentrations (see **Table 3**) are similar to the predicted concentrations across the site in 2016. Slightly lower concentrations are predicted at the development site as it is located further from the M4/ M5 (see **Figure 3**).

The Guidance states that authorities may assume exceedances of the hourly mean objective are only likely to occur where annual mean concentrations are 60 $\mu g/m^3$ or above. Therefore, it is considered highly unlikely that this objective will be exceeded at any of the receptors.

The model has also been run for a with development scenario taking into account predicted increases to traffic levels due to the development and on local roads. The

results indicate that annual mean NO_2 concentrations would change by 1.4 µg/m^3 at worst case locations.

The model estimates no exceedance against the annual mean PM_{10} objective. Potential exceedances of the daily mean PM_{10} objective can be estimated based on the annual mean[17], such that:

$$No.\,24-hour\ mean\ exceedances = -18.5 + 0.00145 \times Annual\ Mean^3 + \left(\frac{206}{Annual\ Mean}\right)$$

On this basis, it is estimated that in 2031 there will be one exceedance of the daily mean PM_{10} limit value, regardless of whether the development takes place or not. Therefore, the daily mean PM_{10} objective would be met as 35 exceedances of limit value are allowed per year.

3.2 Significance

Professional judgement is an important part of the assessment of significance. However, there are various documents available that attempt to qualitatively or quantitatively provide ways of assessing the significance of a development on air quality. The most commonly applied is Environmental Protection UK's Air Quality Guidance Document[18] which outlines how impacts may be assessed quantitatively. The assessment is made up of two steps – firstly to assess the magnitude of change in concentration (e.g. between with and without development) relative to the objective level, and secondly the percentage above/below the objective based upon the total modelled concentration at a given location or receptor. By combining these two values, you can obtain the impact descriptor. This method is presented in **Table 5** below.

Table 5: Significance of change description

Long term average concentration at receptor in assessment year	% Change in concentration relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75 % or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94 % of AQAL	Negligible	Slight	Moderate	Moderate
95-102 % of AQAL	Slight	Moderate	Moderate	Substantial
103-109 % of AQAL	Moderate	Moderate	Substantial	Substantial
110 % of more of AQAL	Moderate	Substantial	Substantial	Substantial

In addition to the criteria provided above, the Guidance document states that the table is intended to be used by rounding the change in percentage pollutant concentrations to whole numbers. Changes of 0 % i.e. less than 0.5 % are described as negligible.

[17] Paragraph 7.92 of LAQM TG(16)
[18] http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf

In applying these criteria, it can be concluded that the worst-case location is receptor F, as the change in concentrations due to the development is greatest. This is expected due to it being close to wo roads, where an increase in traffic is expected.

The long term average concentration at receptor F in the assessment year is < 75 % of the Air Quality Assessment Level (AQAL), and the change in concentration due to the development relative to the AQAL is 3.4 %. Therefore, the impact of the development will be **'negligible'** at worst-case locations. At receptor D, where the long term average concentration is greatest (91 % of the AQAL), the change in concentration due to the development relative to the AQAL is 0.01 % and therefore the impact of the development is also **'negligible'**.

However, this is a fairly simplistic conclusion and other factors may also need to be considered in order to make transparent conclusions. Specific factors to consider may include:

1. Number of properties affected by the slight, moderate or major impacts and a judgement of the overall balance
2. Where new exposure is being introduced into an existing area of poor air quality, then the number of people exposed to levels above the objective or limit value will be relevant
3. The magnitude of the changes and descriptions of the impacts at the receptors
4. Whether or not an exceedance of an objective or limit value is predicted to arise in the study area where none existed before or an exceedance area is substantially increased
5. Whether or not the study area exceeds an objective or limit value and this exceedance is removed or the exceedance area is reduced
6. Uncertainty, including the extent to which worst case assumptions have been made
7. The extent to which an objective or limit value is exceeded, for example an annual mean of 41 μg/m^3 should attract less significance than an annual mean of 51 μg/m^3.

In this case, none of the above criteria are of significance, suggesting that there will be no concerns in terms of exposure to harmful pollutant concentrations across the study area.

3.3 Mitigation Measures

Based on the ADMS results, there is no specific requirement for mitigation, as concentrations are estimated to meet all of the objective levels. However, it is widely acknowledged that there is no safe level of exposure to air pollution[19], and as such, the developer is further encouraged to consider further mitigation measures in order to minimise the use of private vehicles by residents. In order to minimise potential cumulative effects from major developments[20], the Institute of Air Quality Management

[19] https://www.rcplondon.ac.uk/projects/outputs/every-breath-we-take-lifelong-impact-air-pollution

[20] Major developments can be defined as developments where:
The number of dwellings is 10 or above
The residential development is carried out on a site of more than 0.5ha where the number of dwellings is unknown
The provision of more than 1000 m^2 commercial floor space
Development carried out on land of 1ha or more

(IAQM) has provided guidance on the principles of good practice[21] which should be applied to all major development. Examples of good practice include:

- The provision of at least 1 Electric Vehicle (EV) "rapid charge" point per 10 residential dwellings and/or 1000 m^2 of commercial floor space. Where on-site parking is provided for residential dwellings, EV charging points for each parking space should be made.
- Where the development generates significant additional traffic, a detailed travel plan should be implemented.
- All gas-fired boilers to meet a minimum standard of < 40 mg NO_x/kWh
- All gas-fired CHP plant to meet a minimum emissions standard of:
  - Spark ignition engine: 250 mg NO_x/Nm^3
  - Compression ignition engine: 50mg NO_x/Nm^3
  - Gas turbine: 50 mg NO_x/Nm^3
- A presumption should be to use natural gas-fired installations. Where biomass is proposed within an urban area it is to meet minimum emissions standards of:
  - Solid biomass boiler: 275 mg NO_x/Nm^3 and 25 mg PM/Nm^3

On this basis, it is recommended that the developer installs EV rapid charge points and implements a travel plan. It should be noted that the emission benchmarks mentioned above represent readily achievable emission concentrations by using relatively simple technologies. They can be bettered by using more advanced control technology and at additional cost over and above the 'typical' installation.

3.4 Mitigating the Impacts of the Construction Phase

Emissions and dust from the construction phase of a development can have a significant impact on local air quality. The IAQM has produced a document titled 'Guidance on the assessment of dust from demolition and construction'[22] published in May 2015. This guidance contains a methodology for determining the significance of construction developments on local air quality using a simple four step process:

- STEP 1: Screen the requirement for a more detailed assessment
- STEP 2: Assess the risk of dust impacts
- STEP 3: Determine any required site-specific mitigation
- STEP 4: Define post mitigation effects and their significance.

The risk of dust emissions from a demolition/construction site causing loss of amenity and/or ecological impacts is related to a number of factors, including: the activities being undertaken; the duration of these activities; the size of the site; the mitigation measures implemented and meteorological conditions. In addition, the proximity of receptors to the site and the sensitivity of these receptors to dust, impacts the level of risk from dust emissions. Receptors include both 'human receptors' and 'ecological receptors'. The former refers to a location where a person or property may experience adverse effects for airborne dust or dust soiling, or exposure to PM_{10}, over a time period relevant to the air quality objectives (see **Table 1**). Ecological receptors are defined as any sensitive habitat affected by dust soiling, through both direct and indirect effects.

Developments which introduce new exposure into an area of existing poor air quality (e.g. an AQMA) should also be considered in this context.

[21] http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf

[22] http://iaqm.co.uk/guidance/

Following assessment of the impacts of dust as a result of the development, a qualitative risk impact level can be assigned, ranging from 'negligible' to 'high risk'. Based on the designated risk impact level, the mitigation measures which are appropriate for all sites and are applicable specifically to demolition, earthworks, construction and trackout can be determined. Examples of the general measures include:

- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site
- Ensure all vehicles switch off engines when stationary – no idling vehicles
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable
- Ensure all loads entering and leaving the site are covered
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation

The use of the outlined IAQM methodology for assessing the impacts of dust from demolition/construction is considered to be current best practice. Therefore, it is recommended that the developer refers to the relevant IAQM documentation, to help reduce the impact of dust and vehicle exhaust emissions, and liaises with the Local Authority to come up with an acceptable dust management strategy.

4 Summary and Conclusions

An air quality assessment has been undertaken for the proposed re-development of the existing Woodlands Golf Club to provide residential dwellings. South Gloucestershire District Council has three active Air Quality Management Areas (AQMAs) due to exceedances of the annual mean nitrogen dioxide (NO_2) objective. The sites; Cribbs Causeway, Kingswood – Warmley and Staple Hill do not cover the development location.

A conservative approach has been taken in that no improvement in the pollutant background concentrations or road transport emission factors has been assumed between the base year (2016) and the first year of occupation (2031). With expected improvements to the traffic fleet, improvements in pollutant concentrations may however materialise.

An air quality assessment has been carried out using the ADMS-Roads dispersion model to determine the impact of emissions from road traffic on sensitive receptors. Predicted concentrations have been compared with the air quality objectives. The results of the assessment indicate that annual mean NO_2 and particulate matter (PM_{10}) concentrations are below the objective in the 'without' and 'with' development scenario. Based on the evidence it is also estimated that there will be no exceedances of either short term objective for NO_2 or PM_{10}. Therefore, no mitigation is required as the air quality objectives are predicted to be met. Instead, measures such as installing electric vehicle charging points and producing a travel plan, should be considered to reduce the emissions arising from the development. In addition, the developer is encouraged to refer to the IAQM's 'Guidance on the assessment of dust from demolition and construction' in order to minimise the impact of the construction phase on local air quality.

Appendix A – Model Verification

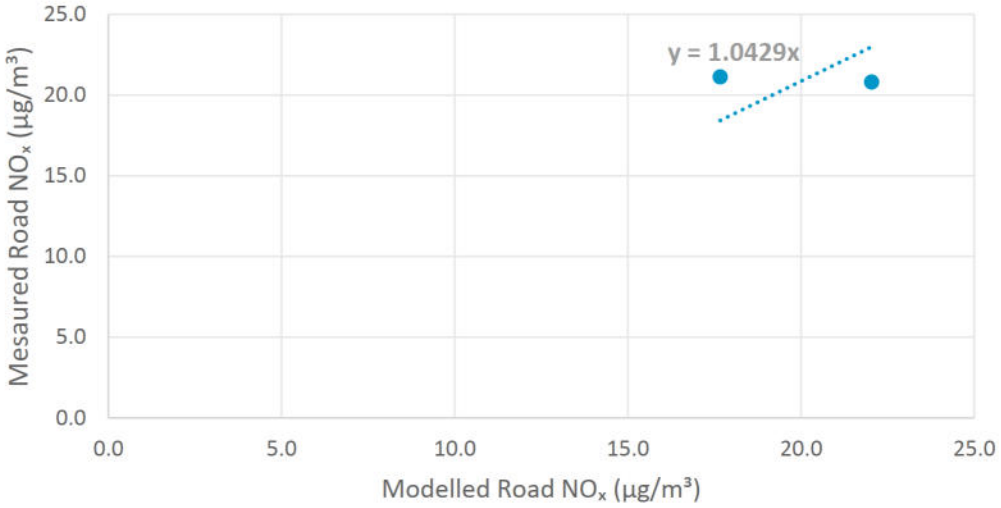
In order to verify modelled pollutant concentrations generated in the assessment, the model has been run to predict the annual mean road-NO_x concentration during 2016 at the DT 34 and DT 35 diffusion tube sites described in **Table 2**.

The model output of road-NO_x has been compared with the 'measured' road-NO_x. Measured NO_x for the monitoring sites was calculated using the NO_x to NO_2 calculator[15].

A primary adjustment factor was determined to convert between the 'measured' road contribution and the model derived road contribution (**Figure A.1**). This factor was then applied to the modelled road-NO_x concentration for each receptor to provide adjusted modelled road-NO_x concentrations. Total NO_2 concentrations were then determined by combining the adjusted modelled road-NO_x concentrations with the 2016 background NO_2 concentration.

The results imply that the model was very accurate at predicting the road-NO_x contribution.

Figure A.1: Comparison of Measured road-NO_x to unadjusted modelled road-NO_x concentrations



RMSE

The root mean square error (RMSE) is used to define the average error or uncertainty of the model. The following RMSE value has been calculated:

NO_2: 1.24

If the RMSE values are higher than ±25 % of the objective being assessed, it is recommended that the model inputs and verification should be revisited in order to make improvements. In this case the model is being assessed against the annual mean objective, which is 40 µg/m³ for NO_2. An RMSE value of less than 10 µg/m³ is obtained and therefore the model behaviour is acceptable.

Appendix B – Traffic Data

Table B.1: Traffic data for 2016 (and prediction for 2031 without development)

Road links	Annual Average Daily Traffic (AADT)	% Heavy Duty Vehicles (HDV)	Speed (kph)
M4	128,516 (161,572)	9.7	112.7
M5	83,593 (105,095)	11.1	112.7
Minor Roads	2,400 (3,017)	2.0	48.3
Trench Lane	9,679 (12,169)	2.0	48.3
Hortham Lane	1,217 (1,529)	2.0	48.3

Note: With development results in an average daily traffic increase of 7,547 vehicles on all roads that have direct access to the site.



Oxford Centre for Innovation

New Road

Oxford

OX1 1BY UK

+44(0)1865 261466

www.aether-uk.com

[redacted]

Land at Woodlands Golf Course
JSP Draft Site Allocations in Support of Development

Written Representations – Transport

December 2016

Broad Quay House, Prince Street, Bristol BS1 4DJ www.vectos.co.uk
Registered address: Vectos (South) Limited, Network Building, 97 Tottenham Court Road, London W1T 4TP. Company no. 7591661

REPORT CONTROL

Document:	Written Representations – Transport
Project:	Land at Woodlands Golf Course
Client:	[redacted]
Job Number:	162451
File Origin:	P:\Projects\162451 - Woodland Golf Course\2. Text\1. Reports\161130 162451 Transport Written Reps v1r3.docx

Document Checking:

Primary Author	Dafydd Rees	**Initialled:**	DR
Contributor	Neil Brant	**Initialled:**	NB
Review By	Neil Brant	**Initialled:**	NB

Issue	Date	Status	Checked for Issue
1	19/12/2016	Final for Issue	NB
2			
3			
4			

Contents

1 INTRODUCTION 1

2 SITE CONTEXT 3

3 PROXIMITY ASSESSMENT 4

4 PROPENSITY TO USE SUSTAINABLE TRAVEL 10

5 PROXIMITY AND SUSTAINABLE TRAVEL CONCLUSIONS 12

6 ACCESS AND MOVEMENT STRATEGY 13

7 TRANSPORT STRATEGY & PRELIMINARY INFRASTRUCTURE 16

8 COMPARISON WITH DRAFT JSP RESIDENTIAL ALLOCATION AREAS 19

9 CONCLUSIONS 21

Figures

162452-SK001 - Proximity and Accessibility to Services

1 INTRODUCTION

1.1 Vectos have been commissioned by [redacted] to provide transport evidence to support a proposal to provide a strategic scale residential led mixed use 'Garden Village' development on land at the Woodlands Golf Club, South Gloucestershire. This proposal consists of a development of 2,000 dwellings, local centre, primary school and public open space.

1.2 The context within which Vectos has assessed the prospective development site, in isolation and in comparison, to other Draft allocations, is that of the planning policy aim of achieving sustainable development.

1.3 The Draft JSP stresses the importance of sustainable access and the overall need to reduce the length of trips. In particular, the JSTS states at paragraph 52, that:

> ***Integrating housing and employment development with investment in reliable high quality transport choices will reduce the length and number of journeys to work, encouraging more sustainable travel modes such as cycling, walking and public transport and reduce the reliance on car based journeys.***

1.4 Paragraph 32 of the National Planning Policy Framework (NPPF), that the sets out the key elements that decisions should take account of, in relation to transport and plan making.

1.5 Paragraph 32 "Plans and decision should take account of whether":

> ***The opportunities for sustainable transport mode have been taken up depending on the nature and location of the site, to reduce the need for major transport infrastructure;***
>
> ***Safe and suitable access to the site can be achieved for all people; and***
>
> ***Improvements can be undertaken within the transport network that cost effectively limit the significant impacts of the development. Development should only be prevented or refused on transport grounds where the residual impacts of development are severe.***

1.6 In particular, these Written Representations will focus on how the Woodlands Garden Village development, given its proximity to the highest proportion of trip destinations of all the Draft allocated sites, will: significantly minimise the need to travel; significantly minimise the distance travelled; maximise the ability of residents to travel by sustainable means, and thereby result in the provision of the most cost effective transport infrastructure and

services enabling the provision of policy compliant levels of affordable housing on the site along with tangible community infrastructure improvements.

2 SITE CONTEXT

2.1 The prospective allocation of the Woodlands Garden Village is located in the eastern quadrant that is formed by the M4 and M5 motorway Almondsbury interchange (Junctions 20/15). The land does not have a direct connection to either motorway and this will be an important aspect of not encouraging private car usage, particularly of the Strategic Road Network, for commuting trips.

2.2 The site is currently developed in the form of a Golf Course & Country Club with associated facilities. Historically the creation of the golf course seen today involved earthworks that required a very large level of imported soils to be used to create undulating terrain. These works involved large scale HGV traffic movements. Therefore, whilst appearing relatively un-developed, in transport terms the land has current and historic land-use resulting in significant traffic generation and movement associated with it.

2.3 The site is located to the immediate north of an area that provides extensive employment opportunities and other significant trip destination land uses. These areas will be complementary to development in so much as minimising the need and distance over which to travel to them, including:

- Almondsbury Business Centre – large scale office and industrial unit development
- Aztec West – large scale office and industrial unit development
- Rolls Royce - manufacturing base
- BAE Systems – office and manufacturing base
- Airbus – office and manufacturing base
- Filton College – large scale education campus
- Ministry of Defence – large scale office development
- Cribbs Causeway – large scale regional shopping centre

3 PROXIMITY ASSESSMENT

3.1 Minimising the need to travel and/or the distance over which travel occurs lies at the forefront of national planning policy and is located at the top of the sustainable travel paradigm. This aim should be at the forefront of determining where development should be directed to in spatial plans such as the JSP. Vectos has undertaken a comprehensive assessment of the proximity to employment (in that it forms the most significant element of travel occurring during times when the transport network is most under stress) for the Woodlands Garden Village site and other Draft JSP allocations north of Bristol, within South Gloucestershire.

3.2 The draft allocation sites considered included:

- Thornbury
- Yate
- Coalpit Heath
- Charfield
- Buckover

3.3 Guidelines for Providing for Journeys on Foot (IHT) suggests that the preferred maximum walking distance for commuting and school journeys is 2km and that approximately 80% of walk journeys in urban areas are less than one mile (1.6km). Manual for Streets (MfS) seeks to achieve a walkable neighbourhood that 'ensures effective access to public transport facilities'. In addition, MfS indicates at paragraph 75 that 'walking offers the greatest opportunity to replace the car as a mode of transport for short journeys, particularly those under two kilometres'. In the context of cycling the DfT Local Transport Note 2/08 Cycle Infrastructure Design sets out typical cycle distances quoting;

> ***'Urban networks are primarily for local journeys. In common with other modes, many utility cycle journeys are under three miles, although, for commuter journeys, a trip distance of over five miles is not uncommon.'***

3.4 This equates to around 5km for most local (utility) journeys and 8km for commuting.

3.5 Using ArcMap (a GIS platform) detailed walking and cycling catchments were calculated equating to distances of 2km, 5km and 8km for Woodlands and the other sites north of Bristol. The distances equate to isochrones following the available road, footway and cycle

network, giving an accurate representation of the facilities within these distances as opposed to an 'as the crow flies' illustration.

3.6 The resulting quantum of employment has been determined by matching travel isochrones to census output areas (2011 Census).

3.7 Two assessments have been undertaken;

- Scenario 1 - 2011 employment levels;
- Scenario 2 - 2011 employment levels plus JSP Draft employment allocations.

3.8 Table 1 below summarises the number of existing jobs (Scenario 1) accessible to each promotion site on foot and by bike - numbers in brackets represent the rank ordering of that site for each travel distance.

Table 1: Scenario 1 - Woodlands vs Draft JSP Residential Sites – Employment Accessibility (not including JSP employment allocations)

Site	Employment Numbers in Sustainable Commute Distance		
	Walk Commute - 2km	Utility Cycle – 5km	Commute Cycle - 8km
Woodlands	4,833 (1)	25,823 (1)	61,452 (1)
Thornbury	4,820 (2)	7,521 (4)	8,819 (5)
Yate	4,173 (3)	11,606 (3)	18,510 (3)
Coalpit Heath	2,878 (4)	12,465 (2)	59,134 (2)
Charfield	885 (5)	3,031 (6)	7,839 (6)
Buckover	66 (6)	6,502 (5)	12,581 (4)

3.9 As outlined in Table 1 above it is evident that the site at Woodlands performs best with regards to proximity, and thereby sustainable access on foot or by bike, to existing employment opportunities and would not be reliant on the delivery of JSP employment allocations to make them accessible to jobs via non-car modes.

3.10 There are more employment opportunities located within all three isochrones, 2km, 5km & 8km, from the Woodlands site when compared to all other candidate sites in, and to the north, of Bristol.

3.11 **In fact, there is twice the number of jobs within the 5km isochrone of the Woodland site than any of the Draft JSP candidate site north of Bristol. Further, with the exception of the Coalpit Heath site there is over three times the number of jobs within 8km (commute cycle distance) of the Woodland site than any of the Draft JSP candidate site.**

3.12 A further assessment has been undertaken which includes provision for Draft JSP employment allocations, including:

- Avonmouth Severnside Enterprise Area (8,000 – 12,000 jobs)
- Filton Enterprise Area (6,000 jobs)
- Emersons Green Enterprise Area (6,000 jobs)
- Bristol Temple Quarter Enterprise Zone (6,000 jobs)

3.13 Table 2 below summarises the number of future jobs (Scenario 2) accessible to each promotion site on foot and by bike - numbers in brackets represent the rank ordering of that site for each travel distance.

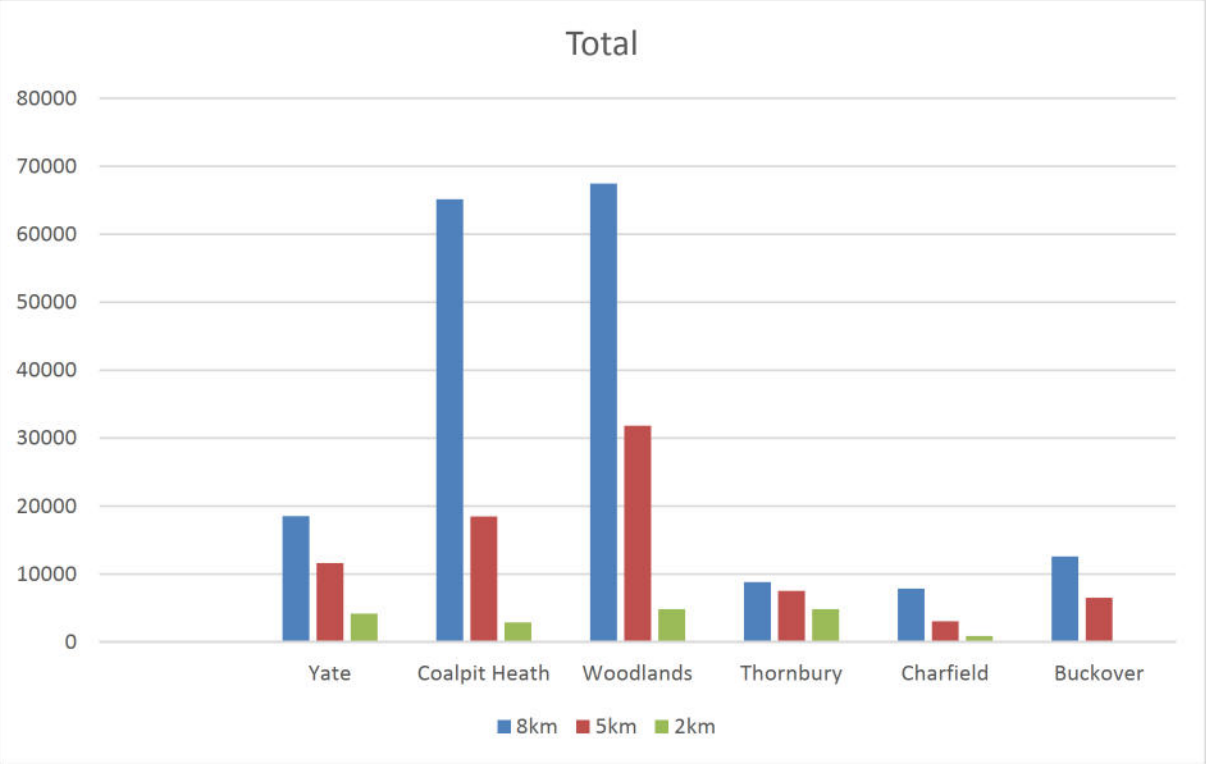
Table 2: Scenario 2 - Woodlands vs Draft JSP Residential Sites – Employment Accessibility (including JSP Draft Employment Allocations)

Site	Employment Numbers in Sustainable Commute Distance		
	Walk Commute - 2km	Utility Cycle – 5km	Commute Cycle - 8km
Woodlands	4,833 (1)	31,823 (1)	67,452 (1)
Thornbury	4,820 (2)	7,521 (4)	8,819 (5)
Yate	4,173 (3)	11,606 (3)	18,510 (3)
Coalpit Heath	2,878 (4)	18,465 (2)	65,134 (2)
Charfield	885 (5)	3,031 (6)	7,839 (6)
Buckover	66 (6)	6,502 (5)	12,581 (4)

3.14 As can be seen from the comparison of Tables 1 and 2 above, there is a minimal impact upon the ranking of the development sites with respect to number of jobs available within walking and cycling distances when the JSP employment allocations are taken into account. Woodlands and Coalpit Heath can access an additional 6,000 jobs each over a 5km cycle, from Filton Enterprise area and Emersons Green Enterprise Area respectively.

3.15 The above statistics are illustrated in Graph 1 Below, which clearly shows that Woodlands Garden Village outperforms all Draft allocated sites when it comes to its proximity to employment opportunities within walking and cycling distances.

Graph 1: Job Numbers accessible from Draft JSP sites



3.16 It is important to note that other than the Coalpit Heath and Woodlands Garden Village prospective residential sites none of the JSP candidate sites are located within acceptable cycling distance of the JSP Draft employment allocations.

3.17 It is clearly apparent that the location of the JSP Draft employment and residential allocations to the north of Bristol (South Gloucestershire) are severely disconnected. The JSP Draft residential sites are clearly not well located with regards to existing and proposed employment areas and thereby do not make the best use of existing or future infrastructure, ability to promote sustainable travel or achieve meaningful sustainable development contrary to the core principle set-out in the Draft JSP.

3.18 In summary and for comparative purposes, Table 3 below compares the percentage of jobs accessible on foot or by bike compared between Woodlands Garden Village and the Draft JSP sites. Taking Woodlands as the datum site, being the most accessible site to employment,

other Draft allocations are ranked as a percentage of job accessible by sustainable travel. The analysis below incorporates the Draft employment site allocations within the JSP.

Table 3: Proximity of Woodlands to Local Amenities and Facilities.

Facility \ Service	Name of Facility	Distance (km)	Walking time (mins)	Cycling time (mins)
Primary School	On Site – (2 form entry)	n/a	n/a	n/a
	Holy Trinity Primary School	1.2	14	5
	Bowsland Green Primary School	0.65	8	2
Secondary School	Bradley Stoke Community School	1.6	19	6
	Patchway Community College	2.5	30	9
Local Centre	On Site	n/a	n/a	n/a
	Pear Tree Road Local Centre	1.4	17	5
GP	Bradley Stoke Surgery	1.6	19	6
Dentist	Bradley Stoke Dental Centre	1.5	18	6
Convenience Store	On Site	n/a	n/a	n/a
	Pear Tree Road Local Centre	1.4	17	5
Supermarket	Aldi	1.6	19	6
	Tesco	1.5	18	6
Retail	Willow Brook Centre	1.5	18	6
	Cribbs Causeway	5	60	19
Leisure	Bradley Stoke Leisure Centre	1.6	19	6
	North Bristol RFC	2.9	35	11
	Almondsbury UWE FC	3.2	38	12
Railway Station	Patchway	3.2	38	12
	Bristol Parkway	4.3	51	16
Post Office	Pear Tree Road Local Centre	1.4	17	5
Library	Bradley Stoke Library	1.6	19	6

3.19 For the 'Greater' Bristol area currently (2011 Census) 86,222 people commute inbound to employment each day whilst 54,262 people commute outbound to employment elsewhere, which is equivalent to nearly 1/3 of all jobs in greater Bristol or 22% of the economically active residents.

3.20 On the basis of 0.978 economically active residents per household (Bradley Stoke 2011 Census data), 2,000 homes at Woodlands Garden Village would result in 1,956 working residents. Given the excellent proximity of Woodlands to extensive employment, 67,452 jobs within cycling distance, it is reasonable to predict that a very high proportion would live and work within the Greater Bristol area and even north Bristol. As such a large proportion of

these residents are unlikely to commute elsewhere and it is quite apparent that c2,000 economically active residents are not going to over-supply the Bristol employment market and result in an exacerbated outward commute due to insufficient local employment.

3.21 Figure 162452-SK001 illustrates the broader proximity and accessibility to existing services, amenities and the Bristol Metro of Woodlands Garden Village. Table 3 above summarises and tabulates those local trip destinations and relates them to both the walk and cycle time in order to reach them from the Woodlands site.

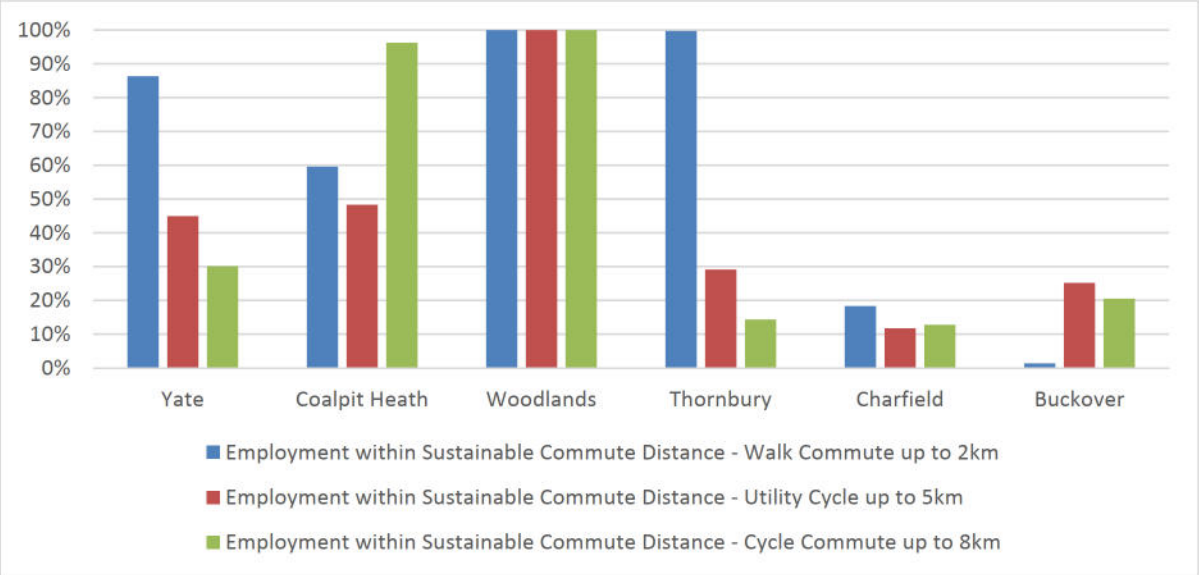
3.22 In summary, it is apparent that Woodlands Garden Village, in addition to the provision of on-site facilities and amenities, will be within easy walk and cycle distance of a wide range of existing local services. The ability to access this wide range of services by sustainable and active modes of travel (walking and cycling) will minimise the propensity for private car usage and thereby equally minimise the traffic impacts and resulting need for road based mitigation meeting the core sustainable objectives of the JSP to a level not achievable by the Draft JSP residential allocations north of Bristol, as quantified in the next section of this Written Representation.

4 PROPENSITY TO USE SUSTAINABLE TRAVEL

4.1 2015 National Travel Survey results clearly illustrate the relationship of travel distance and propensity to use sustainable and active travel modes. For journeys up to 1 mile (1.6km) 79% are made using sustainable travel and 76% walking. Beyond 5 miles (8km) the position is reversed with 80% by private car and only 20% by sustainable travel, primarily local bus and rail. Therefore, in order to achieve truly sustainable development meeting the needs of NPPF and the JSP there has to be an emphasis on sites well located to minimise the distances travelled. In that respect, it is quite apparent that the Woodlands location would maximise that opportunity whereas those contained within the Draft JSP falling comparatively short.

4.2 Graph 2 below illustrates the comparative performance, in terms of sustainable travel to employment, of Woodlands and the other JSP Draft allocation sites.

Graph 2: Woodlands vs Draft JSP Residential Sites – Employment Accessibility by Sustainable Travel (including JSP Draft Employment Allocations)



4.3 At the low end of the scale, the Buckover Draft allocation can only access 1.4% of the jobs by walking that Woodlands can and inclusive of cycling only 25%, with the residual being made up by public transport and private car travel. Charfield fairs only moderately better with only 18.3% of jobs accessible by walking compared to Woodlands and only 12.8% by cycle. Again, the residual travel would be made up by public transport and private car.

4.4 The inevitable result of locating residential development away from primary trip destinations, such as employment, is that of creating car dependant development resulting in unnecessary and avoidable additional burden on infrastructure and CO2 emissions which is contrary to the core principles of sustainability of the JSP and paragraphs: 14 – the presumption in favour of sustainable development; 29 – sustainable development contributing to wider sustainability and health objectives; and, 30 – reductions in greenhouse emissions; of the NPPF.

4.5 Addressing the costly infrastructure demands of poorly located and thereby car dependant development will invariably reduce the ability or scale of those sites to deliver affordable and social housing as well as other vital facilities that will be fundamental to creating communities fully meeting the needs of residents.

5 PROXIMITY AND SUSTAINABLE TRAVEL CONCLUSIONS

5.1 Based on the information presented above, it can be concluded that:

- Woodlands Garden Village has highest level of employment within walk and cycle distance compared to any sites north of Bristol within the Draft JSP;
- Only the Woodlands and Coalpit Heath sites are located within walking and cycling distances of the proposed employment allocations within the Draft JSP;
- The Woodlands site has the greatest potential to maximise sustainable and active travel when compared to the Draft JSP sites and is therefore the most Policy Compliant;
- The increased infrastructure costs resulting from the poorly located Draft site allocations north of Bristol will impact on the ability of sites to deliver the required levels of affordable housing and other community facilities.

6 ACCESS AND MOVEMENT STRATEGY

6.1 Movement and access is illustrated in Figure 3201 (located within the Vision document) for the Woodlands Garden Village site and shows pedestrian, cycle and vehicular access to and through the site. Vehicular access to the land is currently achieved off Trench Lane to the south and Hortham Lane to the north and thereby enabling delivery in a phased manner with multiple points of access.

6.2 For the purposes of determining an outline access strategy, the following indicative development mix has been assumed:

- 2,000 dwellings;
- 2 form entry primary school (420 pupils);
- Local centre including convenience retail provision;
- Care home (100 beds).

6.3 Trip rates assuming 65/35 spilt of open market and affordable dwellings and a 70/30 split of houses and flats. The trip generation forecast, including other modes of travel, will be refined at a later stage once the mix and tenure of dwellings is further established.

6.4 Table 4 below provides a summary of the net levels of traffic generation associated with the Woodlands site taking in to account internalisation of travel through complementary land-uses.

Table 4: Traffic Generation Summary (Net Trips)

	AM Peak Hour			PM Peak Hour		
	IN	OUT	TOT	IN	OUT	TOT
Gross Trips	483	1011	1495	876	563	1438
Internal Trips	-166	-177	-343	-88	-64	-152
Net External Trips	318	834	1152	787	499	1286

6.5 As outlined in Table 4 above, the proposed scheme would retain circa 23% of all AM peak hour trips internally without the need for that travel to be placed upon, and burden, the surrounding transport network and thereby further meeting the core sustainable objectives of the Draft JSP and the NPPF.

6.6 A detailed Travel Plan and sustainable access strategy would be developed for this site and could include the following measures:

- Local and Strategic cycle and pedestrian infrastructure
- Bus service(s) connecting into the metrobus route, which would have wider sustainable transport benefits;
- Personalised Travel Planning (PTP) and welcome packs.

6.7 Taking a sustainable access strategy into account then it is reasonable to apply a working assumption, based on recent Sustrans case studies, of a reduction in car travel by 15% as an absolute minimum (this level of reduction could be delivered by PTP alone). Table 5 below provides a summary of the residual external traffic generation including accounting for the benefits of the Travel Plan and sustainable infrastructure measures.

Table 5: Residual Traffic Generation

	AM Peak Hour			PM Peak Hour		
	IN	OUT	TOT	IN	OUT	TOT
Net External Traffic	265	725	990	766	490	1256
Sustainable mode-shift	-40	-109	-148	-115	-73	-188
Residual Traffic Generation	225	616	841	651	416	1,067

6.8 Overall, a travel reduction of circa 30% is readily achievable at Woodlands due to its proximity to major trip destinations and thereby offers real travel choice, contrasting to that from the majority of JSP Draft sites north of Bristol. This level of private car travel reduction is a significant and material consideration in assessing the relative benefits of the Woodlands site compared to others north of Bristol.

6.9 A high-level assessment of the local travel and traffic impact of the Woodlands site has been undertaken. Development traffic has been distributed on the adjacent highway network based on the 2011 Census dataset *'Location of usual residence and place of work by method of travel to work'* (Table WU03EW) which provide an approximation of the likely routing.

6.10 Table 6 below provides a summary of the baseline traffic numbers and the resultant impact of the development.

Table 6: Development Impacts

Scenario / Source	Junction	Base		Development		% Impact	
		AM	PM	AM	PM	AM	PM
2031 with Metrobus	Bradley Stoke Way / Woodlands Lane Traffic Signals	3,251	3,151	439	557	13.50%	17.66%
	Aztec Roundabout	8,861	7,447	439	557	4.95%	7.47%
2021 with Cribbs Expansion	M5 Junction 16	7,859	6,269	408	517	5.19%	8.25%

6.11 With the significant key destinations and trip attraction being north and central Bristol there is unlikely to be relatively limited attraction for travel through Hortham towards the A38. Furthermore, this travel could be easily constrained by way of gateway junction control, whereby traffic signals metre the volume of traffic that it allows to travel to/from that direction and as such introducing a significant travel time deterrence. This approach to traffic management forms a part of the LDP transport strategy for Cardiff and is an accepted tool to used influence travel behaviour and the provision of safeguards to adjacent communities.

6.12 Whilst the above assessment is undertaken at a high level, it does set-out the significance, or not, of likely traffic impacts at key junctions on the highway network immediately surrounding the site. Whilst this assessment is not exhaustive at this stage it does significantly inform an emerging access strategy for the site. At this preliminary stage that focus is suggested to be as summarised in Table 6 above.

7 TRANSPORT STRATEGY & PRELIMINARY INFRASTRUCTURE

7.1 Other regional cities, Cardiff for example, have a transport policy informing their LDP that seeks to address the travel impacts of development through both 'Carrot' and 'Stick' measures. In the case of Cardiff, the carrot is an Infrastructure Delivery Plan delivering local and corridor transport measures facilitating sustainable and car based travel from development whilst the stick is to provide only limited car based highway improvements so as to sustain travel times at a set benchmark level. i.e. to cap peak hour car travel at an acceptable level as opposed to continued predict and provide.

7.2 A similar balanced approach to infrastructure delivery at Woodlands meets the NPPF and JSP objectives of emphasising the importance of sustainable access. The Masterplan (Figure 3201) illustrates the immediate access strategy whereby the weight of provision is towards sustainable and active travel with:

- Existing footpaths and cycle paths retained and integrated into the development to promote a sustainable movement network and reduce car travel;
- A new bridge parallel to Trench Lane bridge would maintain vehicular links and create new dedicated sustainable modes links to the Metrobus and the wider cycle network;
- Provision of cycle superhighways will be identified and delivered linking Woodlands and the wider north Bristol area to key trip destinations;
- All-modes access from Trench lane; additional access from Woodlands Lane / Gaunts Earthcott Lane;
- Trench Lane is encompassed within the site, its realignment to inform new travel patterns;
- Central Lane through the development provides orientation and legible focus for development;
- Walking and cycling to Bradley Stoke and Woodlands encouraged through the provision of a foot cycle network to supplement enhance the existing North Bristol network;
- Strong desire to extend bus routes from Bradley Stoke / Hortham Hospital through development.

7.3 Sustainable and active travel such as walking and cycling will be encouraged through the provision of on-site and off-site facilities. A new Trench Lane bridge across the M4, in parallel with the existing bridge, will provide a segregated pedestrian and cycle route linking to cycle

superhighways across the north Bristol area linking to major trip destinations, creating safe and convenient routes with the potential for significant travel time benefit compared to car based travel to those trip destinations.

7.4 Public transport will be facilitated through linking the Metrobus to the site as a feeder service. The on-site Central Lane will be built to an appropriate width to facilitate Metrobus services and a new Trench Lane bridge across the M4, in parallel with the existing bridge, will provide dedicated bus only links (lanes) at this key entry point to the development where priority to public transport, over private car, will be achieved at junctions through appropriate traffic control measures.

7.5 The feeder service in to Metrobus and the general additional catchment of 2,000 dwellings will materially improve its commercial viability, through increased patronage, which is struggling to attract a commercial operator/partner. It would seem perverse given this opportunity to locate significant generators of travel (urban extensions) at locations away from Metrobus and thereby further dilute the commercial viability of the services that will need to run on it. In summary, Woodlands will have a material positive influence on commercial viability of the relevant Metrobus services.

7.6 Table 7 below summarises key elements of transport infrastructure provision, subject to further detailed and ongoing consideration.

Table 7: Scale of Impacts and Resulting Mitigation & Strategy

Junction	Mitigation of Impacts informing Access Strategy
Bradley Stoke Way / Woodlands Lane Traffic Signals	• Fully developed sustainable access strategy would deliver a further 2-3% reduction in impact at junction. • Residual impact circa 12-15%. • Impact largely contra-flow to tidality of traffic at junction. • Significant junction reconstruction and capacity improvement likely to be required. • Residual impact potentially addressed through localised junction improvements as opposed to significant reconstruction.
Aztec Roundabout	• Fully developed sustainable access strategy would deliver a further 1-2% reduction in impact at roundabout. • Residual impact circa 5-6% = daily variation in flow. • Impact largely contra-flow to tidality of traffic at junction. • Actual impact subject to detailed modelling but expected to be less than proportionate levels.

	• Scale of residual impact potentially addressed through localised junction improvements as opposed to significant reconstruction.
M5 Junction 16	• Fully developed sustainable access strategy would deliver a further 1-2% reduction in impact at Jct 16. • Residual impact circa 5% = daily variation in flow. • Impact largely contra-flow to tidality of traffic at junction. • Actual impact subject to detailed modelling but expected to be less than proportionate levels. • Residual impact potentially addressed through localised junction improvements as opposed to significant reconstruction.
Other junctions & links	• A38 Hortham Lane junction. • A38 link improvements. • Woodlands Lane & Trench Lane link improvements. • Bowsland Way junction and link improvements.
M4 & M5 Overbridges	• Pedestrian, cycle and Metrobus overbridges
Sustainable Access Strategy	• Pedestrian routes and infrastructure • Cycle superhighways to key destinations • 15 min frequency bus service linking to Metrobus route • PTP & Travel Plan Soft Measures

8 COMPARISON WITH DRAFT JSP RESIDENTIAL ALLOCATION AREAS

8.1 Buckover, in the context of a new Garden Village of 2,200 dwellings, is incredibly poorly related to existing trip destinations, such as employment and therefore from the outset will generate the need for travel way beyond competing sites better located. Located c10km to the north of Bristol all significant key trip destinations would be beyond sustainable active travel lengths (of up to 8kms). A feeder service in to Metrobus, with a route length of c10km before making the connection at Almondsbury, would result in significantly extended and thereby unattractive journey times to most key trip destinations. The resulting effects would be a car dependant development placing greater and unnecessary burden on the existing highway network, notably including the Strategic Road Network (SRN) whereby joining the M5 at junction 14 and leaving at junction 16 would be a key route. Junction 14 is a substantially sub-standard junction configuration unable to accommodate any great increase in use without massive reconstruction whilst junction 16 has significant tidal capacity issues at peak times.

8.2 The suggestion that strategic development of up to 1,000 dwellings at Charfield could support a business case to re-open the village train station is in our view unrealistic. The business case for a new station at Cranbrook, east of Exeter was triggered by 3,400 dwellings and the overall viability of that station in the long term achieved by the provision of 8,000+ dwellings. As with Buckover, the proximity to north Bristol, at c17km, precludes any material level of sustainable and active travel and journeys times by bus would be quite unattractive thereby placing an unnecessary burden on the highway network including the SRN at junctions 14 and 16.

8.3 Whilst Thornbury has a modest degree of local employment this is not to a sufficient level so as to self-contain travel to any significant degree and thereby the location is dependent on employment in north Bristol, 11km or greater away. North Bristol and its employment opportunities are beyond the reasonable cycling commute distance and as such public transport and/or private car are the only viable alternatives. The JSPTS concedes that travel from Thornbury to local rail stations are lengthy and only viable by private car and it has to thereby be questioned whether the site can achieve any meaningful sustainable connectivity to Bristol. Combined with Charfield, it is suggested that development at Thornbury would

facilitate a P&R facility on the A38 and thereby concedes the need to off-set traffic impact, from a car dependant location, by means of 'skimming' existing traffic off the network.

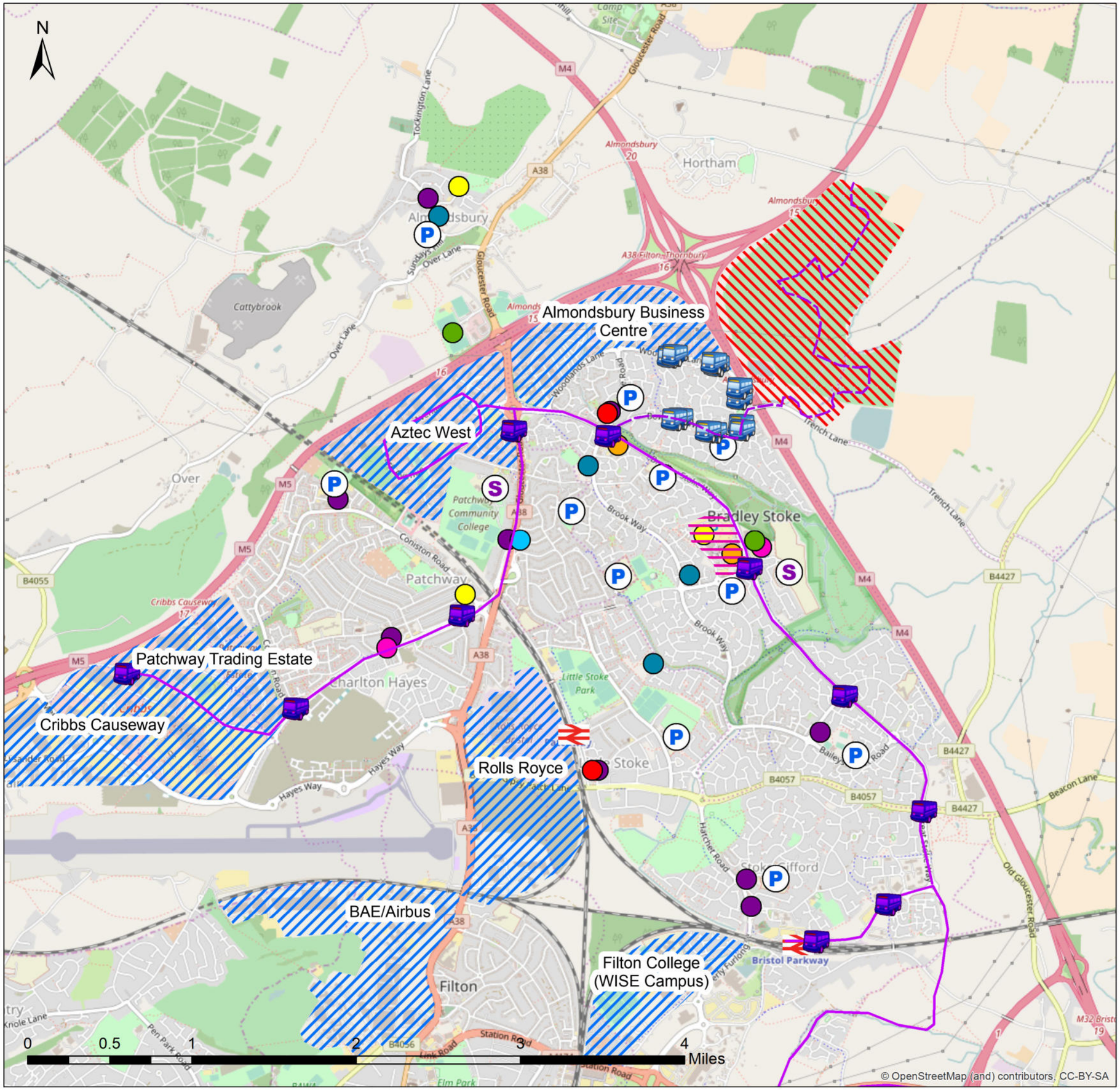
8.4 In summary, it is clear that development at Charfield, Thornbury and Buckover will result in car dependant schemes whereby a large proportion of that car travel is to employment and other trip destinations in north Bristol, and thereby via Junction 16 following the current tidal characteristics of morning in-commute and evening out-commute. The resulting impacts on junction 16 would be that of a significant exasperation of the already significant congestion, delay and CO2 emissions, clearly contrary to the core principles of the JSPTS and NPPF.

9 CONCLUSIONS

9.1 The Woodlands Garden Village offers opportunity to deliver sustainable development at a level not possible from any of the JSP Draft allocation sites north of Bristol. None of the Draft allocation sites are better placed to minimise the distance over which travel occurs or link in to existing sustainable transport infrastructure and services. Fundamentally, unlike JSP Draft allocation sites it meets the core sustainable requirements of the JSPTS and NPPF.

9.2 Many of the JSP Draft allocations are in fact very poorly located to achieve any meaningful level of sustainable travel and will inevitably become car dependent development. Where sustainable travel is proposed at locations, such as a station at Charfield or Metrobus from Thornbury and Buckover, the viability of such infrastructure and services simply does not stack-up and fails to achieve the NPPF criteria for sustainable development to be delivered by commensurately affordable infrastructure. The resulting impact on the highway network, including the SRN, would require significant investment in infrastructure in order to avoid significant additional congestion.

FIGURES



Legend

- Site Boundary
- Bus Stop
- Railway Station
- Leisure Centre
- Bank
- Post Office
- Willow Brook Centre
- Library
- Primary School
- Secondary School
- GP
- Supermarket
- Convenience Store
- Dentist
- Metrobus
- Metrobus Stop
- Metrobus (Potential Route into Woodlands Garden Village)
- Employment
  Including:

  Tesco Extra, Poundstretcher,
  Pets at Home,Poundworld, Icelands,
  Boots, Argos, Dominos,Ladbrokes,
  Harvester, Greggs, Costa, Subway,
  Vodafone, Carphone Warehouse,
  Shoe Zone,Timpsons, O2,
  Card Factory, Reflections and Giant

Woodlands Garden Village

Local Facilities and Amenities Plan

vectos
transport planning specialists

FIGURE:		
162451-SK01		
DRAWN BY: SG	CHECKED BY: NB	DATE: 15/12/2016

grassroots ecology

ECOLOGICAL CONSTRAINTS REPORT

[redacted]

Woodlands Golf Course
Bristol

Ref: 1113
December 2016

t: 01386 700072
w: grassroots-ecology.co.uk
e: enquiries@grassroots-ecology.co.uk

This report has been prepared for the client for the purposes of accompanying this planning application. Any dissemination beyond this purpose is not permitted, without the written consent of Grass Roots Ecology Ltd.

CONTENTS

1.	INTRODUCTION	1
2.	METHODOLOGY	2
3.	ECOLOGICAL CONSTRAINTS	5
4.	RECOMMENDATIONS FOR ANY FUTURE SITE ALLOCATION	9
5.	SUMMARY	11

PLANS

PLAN GRE 1	ECOLOGICAL CONSTRAINTS PLAN

1. INTRODUCTION

1.1 Grass Roots Ecology has been commissioned on behalf of [redacted] to carry out an initial ecological constraints exercise on land at Woodlands Golf Course, Bristol ('the site'), pursuant to lodging representations to the emerging West of England Joint Spatial Plan Document with the view to securing an allocation for residential-led mixed use development.

1.2 This ecological constraints report sets out the findings of an initial phase 1 habitat survey undertaken at the site and in doing so:

a) establishes the ecological constraints and value of the site;
b) sets out additional survey work which would likely be required to support more detailed site proposals; and
c) identifies appropriate recommendations and mitigation that should be accepted when bringing forward any future development of the site.

2. METHODOLOGY

2.1 This ecological constraints report has been prepared with due regard to the recent guidance for ecological report writing produced by the Chartered Institute of Ecology and Environmental Management (CIEEM)[1]. It has been undertaken by a 'suitably qualified ecologist' with over seven years experience as a practising ecological consultant and 11 years experience within the environmental assessment and development planning sectors. The author also holds both Bachelor of Science and Master of Science degrees in ecology related subjects, is a full member of CIEEM and possesses relevant European Protected Species licences with both Natural England and Natural Resources Wales.

2.2 It has been informed by both desk and field survey elements, as detailed below.

Desk Study

2.3 Bristol Regional Environmental Records Centre (BRERC) was contacted in August 2016 to provide protected and notable species records within a 2km search radius of the site.

2.4 Additional information on protected species and statutory designated sites relating to a wider search area was also obtained where appropriate from inspecting the online National Biodiversity Network (NBN) Gateway[2] and Multi-Agency Geographic Information for the Countryside (MAGIC)[3] databases respectively.

Phase 1 Habitat Survey

2.5 An initial extended Phase 1 habitat survey of the site was carried out in November 2016 in line with the methodology set out by the Joint Nature Conservation Committee (JNCC)[4], as recommended by Natural England.

2.6 Whilst the habitat survey was undertaken at a sub-optimal time of year for botanical survey, it is considered that an accurate assessment of the value of the site in ecological terms could be made on this occasion.

2.7 Particular attention was given during the habitat survey for the presence of protected, notable or priority species, with specific consideration given to the following groups/species.

[1] Chartered Institute of Ecology and Environmental Management (CIEEM) (2015) *Guidelines for Ecological Report Writing*, CIEEM, Technical Guidance Series, accessed at: http://www.cieem.net/data/files/Resource_Library/Technical_Guidance_Series/Guidelines_for_Ecological_Report_Writing/Guidelines_for_Ecological_Report_Writing_and_Appendices_May2015.pdf
[2] https://data.nbn.org.uk
[3] http://magic.defra.gov.uk
[4] Joint Nature Conservation Committee (JNCC) (2010) *Handbook for phase 1 habitat survey – a technique for environmental audit*.

Bats

2.8 Given the full legal protection[5] afforded to all UK bat species under schedule 5 of The Wildlife and Countryside Act 1981 (as amended) and schedule 2 of The Conservation of Habitats and Species Regulations 2010 (as amended) (the Habitats Regulations), all trees within the application site were assessed for their potential to support roosting bats. A general assessment of the value of the habitats within the application site for foraging and navigating bats was also made.

Great Crested Newts

2.9 A large pond is located within the application site and this was subject to a specific eDNA survey in June 2015 to ascertain whether it was being utilised by Great Crested Newts *Triturus cristatus*. The testing was undertaken by Fera Science Ltd in line with the protocol recommended by Natural England[6].

Other fully protected species

2.10 Habitat considered to offer suitable opportunities for other species afforded full legal protection[7] under The Wildlife and Countryside Act 1981 (as amended) and Habitats Regulations (for example Otter *Lutra lutra* or Water Vole *Arvicola amphibius*) was also identified where appropriate as part of the habitat survey.

Badgers

2.11 Given the legal protection afforded to Badger *Meles meles* under the Protection of Badgers Act 1992, particular attention was given to any evidence indicating activity, such as the presence of a sett, well-worn paths/push-throughs, footprints, latrines and foraging signs. Where possible, this search extended to 30m from the application site boundary.

Birds

2.12 Any birds were recorded, either visually or by call, as part of the habitat survey. Habitats within the application site were also appraised for their suitability for foraging and nesting birds.

[5] where both the species and its habitat (roosting sites) are protected.
[6] Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F 2014. *Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (Triturus cristatus) environmental DNA*. Freshwater Habitats Trust, Oxford
[7] where both the species and its habitat (breeding and resting sites) are protected.

Other notable species

2.13 The application site was also appraised for its potential to support any other notable fauna and flora. For example, partial legal protection[8] is afforded to the widespread UK reptile species[9] (Common Lizard *Zootoca vivipara*, Slow-worm *Anguis fragilis*, Grass Snake *Natrix natrix* and Adder *Vipera berus*) under Schedule 5 of The Wildlife and Countryside Act 1981 (as amended) and any habitats considered suitable for this group within and in close proximity to the application site were identified.

Ecological Evaluation

2.14 The value of the habitats within the site and nearby designated sites have been assessed as part of this ecological constraints report with due regard to the latest guidelines for ecological evaluation published by CIEEM[10]. These guidelines also set principles for identifying and determining the magnitude of impacts.

[8] where the species itself is protected (from killing and injury) but not its habitat.
[9] Note that the survey area does not contain suitable habitat for the less common UK reptile species (Sand Lizard *Lacerta agilis* and Smooth Snake *Coronella austriaca*) which are afforded full legal protection (like bats and Great Crested Newts).
[10] Institute of Ecology and Environmental Management (now CIEEM) (2006) *Guidelines for Ecological appraisal in the United Kingdom*

3. ECOLOGICAL CONTRAINTS

Context and surrounding habitats

3.1 The site is located within a predominately urban context on the northeast edge of Bristol. The M32 and M5 motorways for the western and northern boundaries of the site respectively.

Statutory designated sites

3.2 The nearest statutory designated site is Three Brooks Local Nature Reserve located approximately 500m to the southwest of the site. Three Brooks is recognised on account of its ancient woodland and other habitats which provide opportunities for a range of wildlife including Reed Bunting *Emberiza schoeniclus*, Skylark *Alauda arvensis*, Great Crested Newt and Slow-worm.

3.3 In addition, Monks Pool and Bradley Brook Local Nature Reserve is located approximately 1.8km to the southeast of the site. This Local Nature Reserve is recognised principally for its interconnected pond habitats.

3.4 There are no further statutory designated sites within 2km of the site.

3.5 Of elevated conservation status is the Severn Estuary located approximately 7.5km to the west of the site which is designated as a Special Protection Area and Ramsar site on account of its internationally important bird populations. However, this statutory designated site is considered to be located outside of the zone of influence and is therefore not judged to represent a constraint for any future site allocation at this site.

Non-statutory designated sites

3.6 No non-statutory designated sites are located within the site boundary. A total of eight Sites of Nature Conservation Interest (SNCI) are located within 2km of the site:

- Hortham Wood SNCI – located approximately 350m to the north recognised for its woodland/scrub habitat and notable birds;
- Savages Wood SNCI – located approximately 600m to the south recognised for its ancient woodland habitat and diverse flora;
- Corporation Wood SNCI – located approximately 600m to the east recognised for its woodland habitat;
- Tockington Park Wood SNCI – located approximately 350m to the north recognised for its ancient woodland habitat;
- Webbs Wood and Bradley Stoke Lake SNCI – located approximately 1.1km to the south recognised for its ancient woodland and grassland habitats;

- Wood West of Oldfield Farm SNCI – located approximately 1.2km to the northeast recognised for its woodland habitat;
- Monks Pool and Bradley Brook SNCI – located approximately 1.7km to the southeast recognised for its woodland and wetland habitats; and
- Field north of Whatleaze Wood SNCI – located approximately 1.8km to the northwest recognised for its species-rich neutral grassland habitat.

Habitats within the site

Amenity grassland

3.7 The majority of the site represents intensively managed seeded grassland which offers limited value in ecological terms. Some areas adjacent to the fairways offer a longer sward and some elevated (albeit limited) value in botanical terms.

Rough grassland

3.8 Some incidental areas of longer grassland are present principally around the boundaries of the site, as shown on Plan GRE 1. Here, any ecological value is likely to be associated with offering potential habitat for common reptiles rather than for any notable botanical interest.

Ponds

3.9 A number of large man-made ornamental ponds are present across the site. The majority of these are considered to be of limited value with little, if any, notable aquatic/marginal vegetation observed. Some ponds are of relatively greater value on account of the marginal vegetation (reed-beds) present, as indicated on Plan GRE 1. Some of the larger ponds in the southwest of the site are known to be stocked with fish and are used for angling purposes.

Trees/scrub

3.10 Mainly immature/early semi-mature trees interspersed with scrub are present along the embankments to the M32 and M5 motorways along the western and northern boundaries of the site. More mature trees of relatively higher intrinsic ecological value are present alongside Hortham Brook.

Stream

3.11 Hortham Brook traverses the site and is considered to represent the most valued habitat feature within the context of the site, as shown on Plan GRE 1. This narrow and sinuous watercourse has a well established riparian zone comprising semi-mature/mature trees (a number comprising mature Oak *Quercus Robur*), areas of scrub and marginal vegetation. It is also considered to offer a number of opportunities for a range of wildlife.

Hedgerows

3.12 Two hedgerows are located in the northeast of the site, as shown on Plan GRE 1. Some sections are gappy, although, other sections offer relatively good structure and some species diversity.

Other

3.13 Two buildings and areas of associated hardstanding are present within the site (the clubhouse and a large prefabricated storage building).

Fauna considered to be utilising the site

Bats

3.14 BRERC returned records for Common Pipistrelle *Pipistrellus pipistrellus*, Soprano Pipistrelle *Pipistrellus pygmaeus*, Noctule bat *Nyctalus noctula*, Serotine bat *Eptesicus serotinus* and Daubenton's bat *Myotis daubentonii* within the requested search area.

3.15 Habitats within the site, in particular Hortham Brook corridor, are considered to offer good foraging and navigating opportunities for local bat populations.

3.16 None of the trees and buildings within the site were identified as having any obvious features which could support roosting bats.

Amphibians (Great Crested Newts)

3.17 Specific aquatic surveys of the ponds within the site were undertaken by Ecology Solutions in 2009 as part of a previous planning consent for remodeling a number of golf holes. These surveys did not find any Great Crested Newts but did confirm populations of Smooth Newt *Lissotriton vulgaris*.

3.18 Whilst populations of Great Crested Newt are known in the wider area the ponds are not considered to have become colonised by this protected species in the interim period. Nevertheless, updated surveys (for example eDNA) of the ponds would be undertaken to support any future detailed proposals for the site.

Badgers

3.19 Badgers are known in the local area with a number of records returned by BRERC within the search area.

3.20 The short sward amenity grassland is considered to provide good foraging habitat for this species, however, no evidence of use was found during the habitat survey. Nevertheless, areas of dense scrub within the site may conceal

setts and further survey work would likely be required to support any future detailed proposals for the site

Birds

3.21 A number of notable birds were returned by BRERC within the search area. It is understood that Reed Bunting have been recorded within the site and some of the ponds in the northeast do offer suitable habitat for this notable bird species.

3.22 The Hortham Brook corridor and tree/scrub habitats are also considered to offer good foraging and nesting habitat for a number of other birds, potentially notable species, and a series of specific breeding bird surveys would likely be required as part of any future detailed proposals for the site to fully understand the value of any site for breeding birds.

3.23 In relation to wintering birds, the site is considered to be of limited value, principally on account of the use as a golf course and its location adjacent to urban areas.

Reptiles

3.24 Some areas of rough grassland offer suitable habitat for common reptile species and specific surveys of these areas would likely be required to support any future site allocation.

Otter and Water Vole

3.25 Both Otter and Water Vole are known in the local area (Three Brooks Local Nature Reserve, Patchway Brook, Stoke Brook and Bradley Brook). Whilst no records were returned by BRERC corresponding to Hortham Brook within the site, this watercourse is considered to offer opportunities for both species.

Other

3.26 Some limited areas of habitat (hedgerows and scrub) are judged (superficially) and offering some suitable habitat for the protected Hazel Dormouse *Muscardinus avellanarius*. Specific surveys may be required (depending on habitat retention) as part of any future detailed proposals for the site

3.27 Following the initial habitat survey and desk study undertaken no other protected/notable species are considered to be utilising habitats within the site.

4. RECOMMENDATIONS FOR ANY FUTURE SITE ALLOCATION

4.1 Habitat features of note within the context of the site have been identified on Plan GRE 1 and these constraints and resultant considerations for future development have informed the initial concept masterplan which accompanies the representation submission.

Designated sites

4.2 Development of the site is not considered to materially affect any of the identified designated sites.

Habitats

4.3 The hedgerows, Hortham Brook (and associated corridor), some ponds and scrub habitats are considered to be of ecological value within the context of the site (as identified on Plan GRE 1).

4.4 The concept masterplan demonstrates retention of these habitat features and integration within wider green infrastructure, which would be able to accommodate informal open space and a range of new habitats.

4.5 Hortham Brook is worthy of retention and specific 10m buffers either side of this feature is recommended for any future site allocation in order to safeguard its role as a wildlife corridor and deliver new planting to help achieve net gains for biodiversity.

4.6 Loss of the amenity grassland which dominates remaining areas within the site is not considered to be significant in ecological terms as long as retained and new habitats are integrated and enhanced as part of a green infrastructure strategy.

Fauna

4.7 The retention of protected/notable species would need to be given due regard as part of any emerging detailed design concepts associated with any future site allocation. Mitigation, enhancement and necessary safeguarding measures during construction would be required to ensure species protection and legal compliance.

4.8 Further survey work in relation to the following groups/species would likely be required to inform any future allocation and development of the site:

- bats – a series of surveys to establish activity patterns and species;
- Badgers – further check surveys of dense scrub areas which may conceal setts;
- Otter/Water Vole – specific checks along Hortham Brook;

- Great Crested Newts – eDNA screening of ponds;
- reptiles – to establish any presence within suitable habitat;
- birds – a series of breeding bird surveys to establish any notable species; and
- Hazel Dormice – specific surveys of suitable habitat should these be lost to development proposals.

4.9 This additional survey work would establish a detailed ecological baseline upon which impacts can then be assessed for any future development of the site. This would form part of a full ecological impact assessment suitable in scope to accompany any planning application submission.

4.10 An ecological construction and management plan would also need to be produced to ensure habitats and species protection, legal compliance and delivery of net ecological gains post-construction.

4.11 Consultation with South Gloucestershire Council (and Natural England where required) would be required to agree the scope of additional survey work and the principles of any species-specific mitigation strategies.

5. SUMMARY

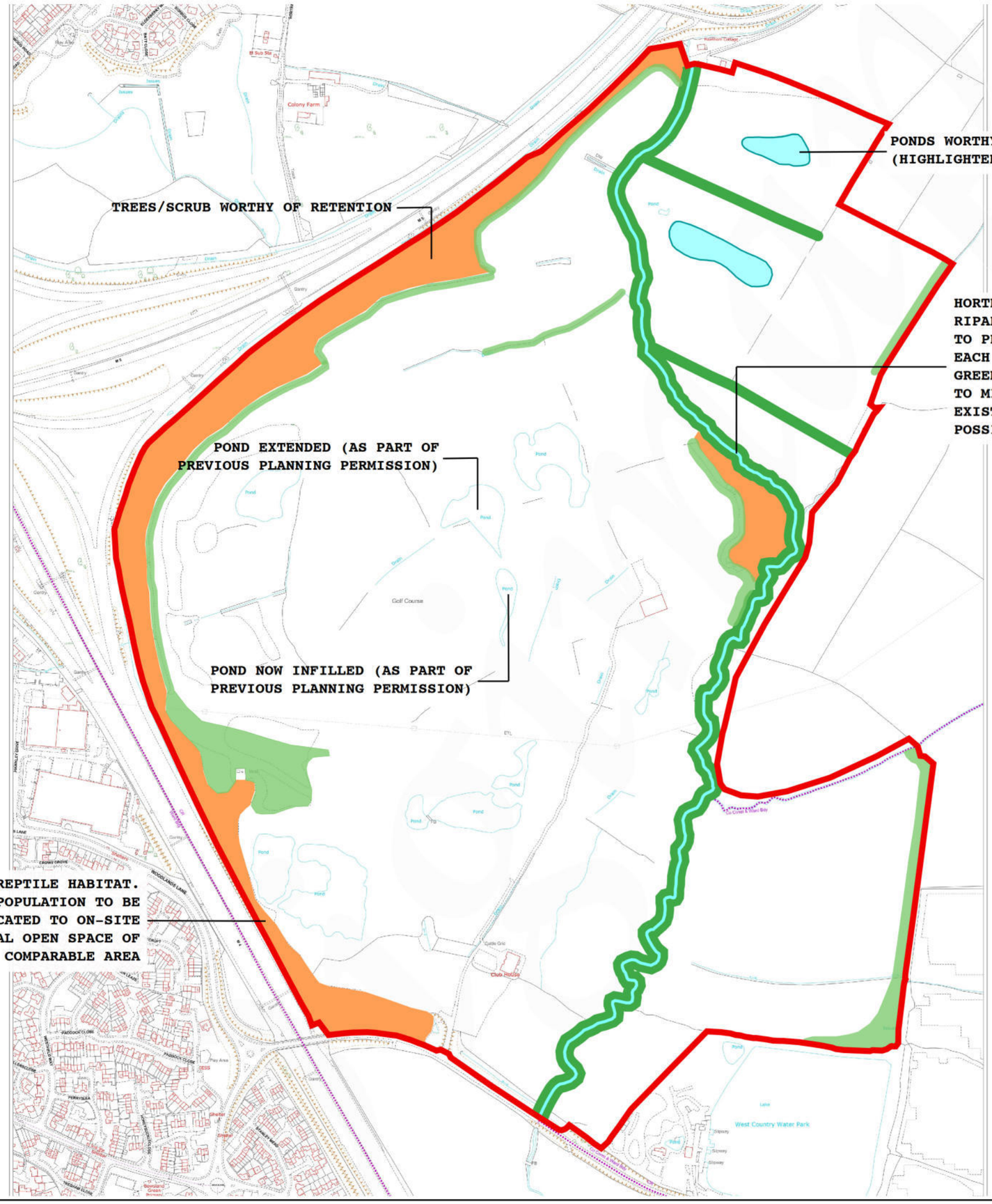
5.1 An initial phase 1 habitat survey and desk study has been undertaken by Grass Roots Ecology pursuant to lodging representations to the emerging West of England Joint Spatial Plan Document with the view to securing a future site allocation for residential development.

5.2 There are considered to be no overriding ecological constraints in relation to any future allocation of the site. The concept masterplan has been informed by advice received from ourselves and is considered to respond well to the ecological constraints and opportunities that the site offers. Given the 'sterile' nature of large parts of the golf course there is considered to be an opportunity to improve the biodiversity value of the site through the delivery of sensitively designed and laid out public open space. The current concept mater-plan goes some way towards achieving this.

5.3 However, additional survey work and species-specific surveys would be required to obtain a full and comprehensive ecological baseline and allow a full ecological impact assessment.

WOODLANDS GOLF COURSE, BRISTOL
Initial Ecological Constraints and Opportunities Plan

Grassroots ecology



KEY:

- SURVEY AREA BOUNDARY
- POTENTIAL REPTILE HABITAT
- HEDGEROW WORTHY OF RETENTION
- HORTHAM BROOK CORRIDOR
- TREES/SCRUB

CLIENT:	[redacted]
REF:	1113
REV:	A
DATE:	29.11.16
SCALE:	nts

north

© Grass Roots Ecology Ltd

T: 01386 700072 | E: enquiries@grassroots-ecology.co.uk | W: www.grassroots-ecology.co.uk

Land at Woodlands Golf Course – JSP Draft Site Allocations in Support of Development

Written Representations – Flood Risk and Drainage

December 2016

162451 v1r0

Flood Risk and Drainage Written Representations

Introduction and Policy Context

Vectos have been commissioned by [redacted] to provide flood risk and drainage evidence to support the allocation of land at the Woodlands Golf Club, South Gloucestershire for a residential lead urban extension development.

The context within which Vectos has assessed this site is that of achieving sustainable development. The West of England Joint Spatial Plan vision is to "*respond to the critical issues facing the West of England and ensure the strategy is founded on sustainable development principles*". Four overarching priorities have been identified to deliver this vision. Strategic priority 3 focuses on the Environment and makes specific reference to building resilience through protection against flood risk.

Flood risk therefore forms a guiding principle in the allocation of development sites in the draft JSP. It is emphasised that "*significant parts of the JSP plan area are located in low lying areas at risk from flooding*". The spatial strategy intends to "*exclude sites that experience high flood risk…an Exception Test is required if locations in the flood zone are to be pursued.*"

Within this context, it is also important to draw attention to the National Planning Policy Framework (NPPF) and South Gloucestershire Local Plan 2016 – 2027.

Paragraph 100 of the NPPF advises that:

> *"Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk".*

Paragraph 101 of the NPPF advises that:

> *"The aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding".*

Policy CS9 of the Local Plan states that new developments are expected to:

> *"Reduce and manage the impact of flood risk through location, layout, design, choice of materials and the use of Sustainable Drainage Systems (SuDS)".*

These Written Reps aim to demonstrate that Woodlands Garden Village is appropriate for development from a flood risk and drainage perspective, consistent with the requirements of the NPPF, Local Plan and the principles of the JSP. Further to this, the sections below explain how the existing drainage features

enable sustainable drainage and a landscape led development strategy that does not compromise the site's viability to meet other development objectives but instead offers opportunities to achieve a range of sustainability goals.

Site Context

The prospective allocation at Woodlands Garden Village is located on the north fringe of Bristol and is defined by fairly pronounced topography with a significant drainage network made up of a number of ditches, ponds and swales, that form features as part of the existing golf course. The site slopes towards Hortham Brook flowing along the eastern boundary of the site. Hortham Brook leaves the site where is passes beneath Trench Lane and continues beyond the M4 to join Patchway Brook.

Flood Risk

As shown on the Environment Agency (EA) Flood Map for Planning (below), the proposed allocation lies almost entirely in Flood Zone 1. The majority of the proposed allocation is therefore assessed as having less than 1 in 1,000 annual probability of flooding from rivers and/or the sea. The NPPF advises that land areas classified as Flood Zone 1 are appropriate for all forms of development.

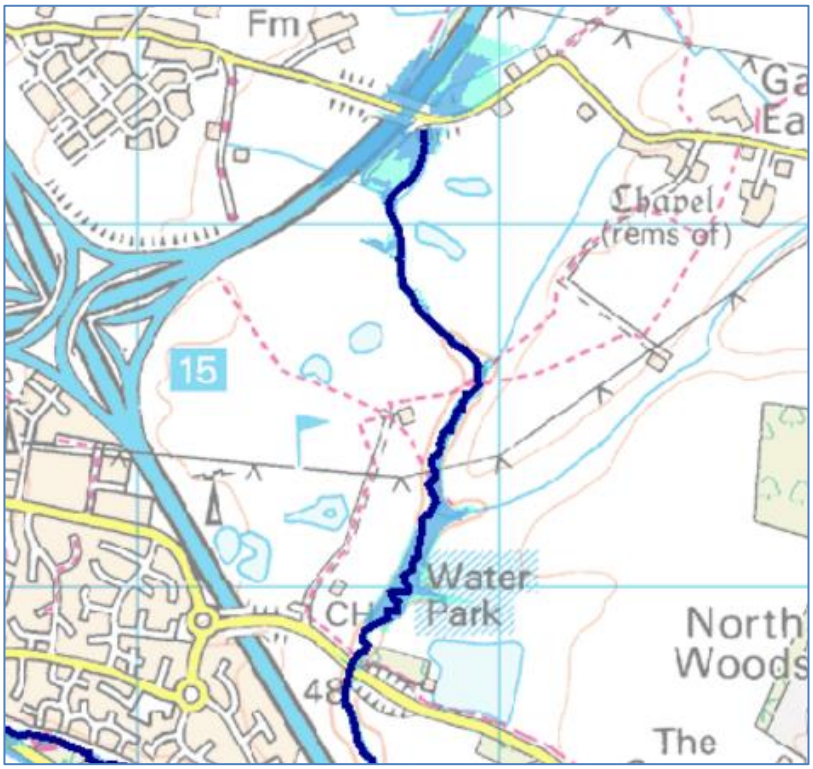
The Hortham Brook flows alongside the east boundary of the golf course and passes through the northern part of the site. The brook is associated with a narrow strip of Flood Zone 2 and Flood Zone 3 along its banks. These areas of floodplain are very limited; whilst they may be more susceptible to fluvial flooding it makes up approximately less than 3% of the site and all development will be steered into Flood Zone 1.

The flood risk from surface water is considered to be very low across the majority of the site. Some isolated areas of surface water flooding are associated with the existing water features, such as ponds and drainage channels that flow into Hortham Brook. It is intended that development will be designed around these features, which will be utilised for the management of surface water drainage. Surface water flood risk is therefore not considered a constraint to the Woodlands Garden Village development site.

The Environment Agency Risk of Flooding from Reservoirs map shows the risk associated with the West Country Water Park (located to the south east of the site). Inundation shown on reservoir mapping associated with a breach of the reservoir is largely directed away from the site. A relatively small amount of flooding is shown to flow up Hortham Brook in the vicinity of the site, but this mostly effects the area immediately adjacent to the brook and is limited in extent. The associated notes to the reservoir flood mapping state that "Reservoir flooding is extremely unlikely to happen…the Reservoirs Act 1975 (England), ensures that reservoirs are inspected regularly and essential safety work is carried out." Reservoir flood risk at the site is therefore negligible.

All other sources of flood risk at the site are considered to be very low.

Environment Agency Flood Map for Planning



Surface Water Drainage

It is well understood that one of the effects of development is typically to reduce the permeability of a site and consequently change its response to rainfall. The NPPF states that flood risk to land and property must not be increased as a result of development. Surface water drainage arrangements must ensure that volumes and peak discharge rates leaving the site are no greater than those for the site prior to development, including an appropriate allowance for climate change.

The West of England Drainage Developer Guide stresses that one of the core principles of sustainable drainage is the application of the discharge hierarchy to identify the most sustainable and future-proof receptor for surface water runoff. An infiltration-led strategy is considered limited for much of the Bristol area due to the underlying character of soils and geology. Where infiltration is not possible or only partially viable, the drainage hierarchy preference is discharge to a surface water body. Woodlands Garden Village has an existing well established network of drains, ponds and swales, which accommodate surface water runoff from the current golf course. The existence of this drainage and storage network lends itself to a natural attenuation-led drainage strategy. These various features can easily be enhanced to offer the full range of source, site and regional control measures.

Significant benefits with respect to water quality, biodiversity, recreation and amenity can also be achieved through relatively minor adjustments to the existing drainage features. For example, these SuDS areas can also provide visual diversity to the character and nature of the spaces used for walking/cycling routes and community play areas.

Figure 1 below provides a conceptual diagram of a SuDS feature and highlights how the existing site ponds can be enhanced to provide habitat and ecological diversity while also functioning as an attenuation and flow control feature. Figure 2 has been taken from the SuDS manual and provides a visual example of

how an attenuation basin can form the focal point of walking and cycling connections across the development and create visual coherence with the surrounding landscape.

Figure 1 Plan view and profile of SuDS pond details (Source: SuDS Manual CIRIA C753)

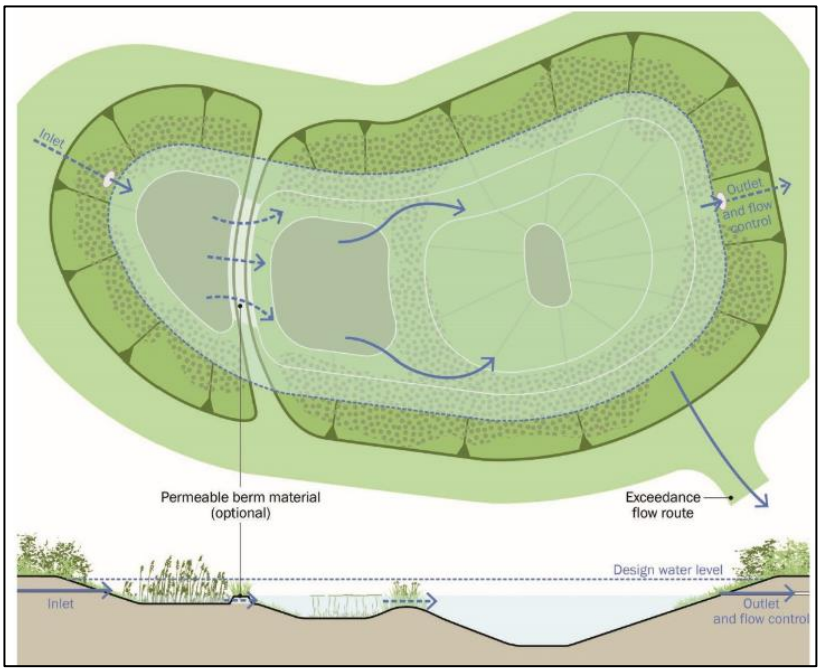


Figure 2 SuDS manual example of using attenuation features to create amenity value



Comparison with other North Bristol Draft Site Allocations

Representations for residential development schemes in Thornbury and Charfield were submitted and put forward for allocation as part of the draft JSP development. Following a review of flood risk information at these sites, it is clear that there are significant portions within Flood Zone 3 (adjacent to the watercourse) and this poses a significant constraint to the development of these draft site allocations. Significant infrastructure works would be required to develop some of the sites in Thornbury and Charfield, should development be proposed in the floodplain. Not only would this result in major capital costs to meet with the requirements of planning policy, but more sustainable alternatives are available. In accordance with the Sequential Test, Woodlands Garden Village has negligible flood constraints and is considered preferable for development over many of the Thornbury sites from a flood risk context.

Flood Risk and Drainage Conclusions

Based on the information presented above, it can be concluded that:

- The Woodlands Garden Village development site experiences very low risk of flooding, with the majority of the site in Flood Zone 1. Development of the Woodlands site therefore meets with the requirements of the NPPF, South Gloucestershire Council Local Plan and the JSP principles, and completely negates the need for a Sequential Test and thus also the Exception Test.
- Woodlands Garden Village has a well-established surface water drainage network that affords an existing means to develop a drainage strategy by enhancing what is already present. This offers major advantages with respect to construction costs and will ensure all the benefits of a SuDS strategy can be established; such as improvements to biodiversity, recreation and visual amenity. Consequently, the site is in keeping with the strategic environmental priorities of the draft JSP.
- Some of the sites put forward in the JSP are less favourable development locations from a flood risk perspective, having significant areas within Flood Zone 3. In particular, Thornbury and Charfield are constrained by flood risk and considered to be less sustainable compared to the Woodlands Garden Village development.
- Given the above, on the basis of flood risk and drainage, Woodlands Garden Village development is strongly considered to be a favourable candidate site for allocation within the West of England JSP.

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS

Green Belt Review: Sites and Boundaries Study

Woodlands Garden Village, Bristol

[redacted]

December 2016

Green Belt Review: Sites and Boundaries Study

WOODLANDS GARDEN VILLAGE, BRISTOL

[redacted]

December 2016

Prepared by:	Sian Jones / Mark Flatman
Position:	Senior Landscape Architect / Director
Qualifications:	BA (Hons), MA / CMLI, Dip (Hons) LA, BA (Hons)
File name:	1878 Green Belt Review 16 12 19.docx
Date issued:	19th December 2016
Checked by:	MF

CONTENTS

1	**INTRODUCTION**	**1**
1.1	The Site	1
1.2	Purpose, Objectives and Structure of the Study	2
1.3	Methodology	3
2	**PLANNING AND LEGISLATION BACKGROUND TO THE STUDY**	**4**
2.1	The National Planning Policy Framework (NPPF)	4
2.2	The South Gloucestershire Local Plan	6
2.3	The Bristol and Bath Green Belt: History and Extent	6
3	**SUMMARY OF EXISTING GREEN BELT ASSESSMENTS, WITH RESULTS OF RELEVANCE TO THE SITE**	**8**
3.1	Introduction	8
3.2	The South Gloucestershire Strategic Green Belt Assessment, 2006	8
3.3	South Gloucestershire Core Strategy Strategic Green Belt Assessment, December 2011	9
3.4	The West of England Joint Spatial Plan (JSP) Green Belt Assessment, November 2015	10
4	**CRITIQUE OF THE METHODOLOGY USED IN THE WEST OF ENGLAND JOINT SPATIAL PLAN GREEN BELT ASSESSMENT, NOVEMBER 2015**	**17**
4.1	Critique of the Methodology used in the West of England Joint Spatial Plan Green Belt Assessment, November 2015	17
4.2	Proposal for an Adjusted LLA Methodology;	22
5	**RE-ASSESSMENT OF STRATEGIC ASSESSMENT AREA 'LAND TO NORTH-WEST OF WINTERBOURNE, IN LINE WITH THE ADJUSTED LLA METHODOLOGY**	**24**
5.1	Re-assessment of Strategic Assessment Area 'Land to north-west of Winterbourne'	24

5.2	Results of Re-assessment	26
6	**SITE ASSESSMENT, IN LINE WITH THE ADJUSTED LLA METHODOLOGY**	**27**
6.1	Site Assessment	27
6.2	Results of Re-assessment	29
7	**CONCLUSION**	**30**

APPENDIX A FIGURES 1 - 6:

FIGURE 1: EXTENT OF THE BRISTOL AND BATH GREEN BELT – TAKEN FROM THE WEST OF ENGLAND JOINT SPATIAL PLAN GREEN BELT ASSESSMENT, NOVEMBER 2015.

FIGURE 2: MAP OF CELLS WITHIN THE BRISTOL AND BATH GREEN BELT – TAKEN FROM THE WEST OF ENGLAND JOINT SPATIAL PLAN GREEN BELT ASSESSMENT, NOVEMBER 2015.

FIGURE 3: EXTENT OF THE SITE, CELLS 14 AND 15 - CELLS TAKEN FROM THE WEST OF ENGLAND JOINT SPATIAL PLAN GREEN BELT ASSESSMENT, NOVEMBER 2015

FIGURE 4: KEY DIAGRAM FROM THE SOUTH GLOUCESTERSHIRE LOCAL PLAN CORE STRATEGY 2006 – 2027

FIGURE 5: AERIAL PHOTOGRAPH

FIGURE 6: LANDSCAPE CHARACTER AREAS - TAKEN FROM SOUTH GLOUCESTERSHIRE LANDSCAPE CHARACTER ASSESSMENT, 2013

APPENDIX B UDB'S CONCEPT MASTERPLAN FOR WOODLANDS (PRELIMINARY DRAFT, DECEMBER 2016)

APPENDIX C RELEVANT EXTRACTS FROM SOUTH GLOUCESTERSHIRE LOCAL PLAN CORE STRATEGY, 2006 - 2027

APPENDIX D RELEVANT EXTRACTS FROM THE WEST OF ENGLAND JOINT SPATIAL PLAN, NOVEMBER 2016

APPENDIX E RELEVANT EXTRACTS FROM THE SOUTH GLOUCESTERSHIRE STRATEGIC GREEN BELT ASSESSMENT, 2006

APPENDIX F RELEVANT EXTRACTS FROM THE SOUTH GLOUCESTERSHIRE CORE STRATEGY STRATEGIC GREEN BELT ASSESSMENT, DECEMBER 2011

APPENDIX G WEST OF ENGLAND JOINT SPATIAL PLAN GREEN BELT ASSESSMENT, NOVEMBER 2015

1 INTRODUCTION

1.1 The Site

1.1.1 This Green Belt Review: Sites and Boundaries Study by Liz Lake Associates (LLA) assesses a parcel of land known as Woodlands Golf Course (hereafter identified as 'the Site') in South Gloucestershire which currently lies within the Bristol and Bath Green Belt (refer to *Figure 1: Extent of the Bristol and Bath Green Belt*).

1.1.2 In recreational land use at present in the form of a Golf Course, the Site is being promoted for Green Belt release and subsequent residential-led mixed use development by [redacted]

1.1.3 The Site occupies an area of 108.6ha. For the purpose of this report its boundary is based on the proposed residential development limit shown on UDB's Concept Masterplan for Woodlands, Preliminary Draft, December 2016 (refer to *Appendix B*).

1.1.4 Located to the north-east of the city of Bristol, the Site lies directly to the east of the M4-M5 Almondsbury Interchange. Large manmade embankments separate the Site from the motorways, which serve to define Bristol's current existing northern urban edge.

1.1.5 The Site falls within Cell 14 in the West of England Joint Spatial Plan (JSP) Green Belt Assessment, November 2015 (refer to *Figure 2: Map of Cells within the Bristol and Bath Green Belt*). Cell 14 is assessed in the JSP Assessment in combination with its adjacent Cell 15 to the south-east (together referred to as Strategic Assessment Area 'Land to north-west of Winterbourne'). These Cells combine to cover an area of c. 715ha, of which the Site - at 108.6 ha - occupies a small portion in the north-west corner (refer to *Figure 3: Extent of the Site, Cells 14 and 15*). The Site is considered to represent a significant departure from the remainder of the landscape within Cells 14 and 15 in terms of its landscape resource (landscape fabric and landscape character) and visual amenity (refer to the Strategic Landscape and Visual Assessment, produced by LLA in December 2016.

1.1.6 This study should be read in conjunction with the Strategic Landscape and Visual Assessment and the Landscape Sensitivity and Capacity Study for Woodlands Garden Village, Bristol, both produced by LLA in December 2016.

1.2 Purpose, Objectives and Structure of the Study

1.2.1 The main objectives of this Study are to:

- Provide a critique of the methodology used in the West of England Joint Spatial Plan Green Belt Assessment, November 2015; propose an adjusted LLA methodology.
- Re-assess Strategic Assessment Area 'Land to north-west of Winterbourne' (within which the Site lies), in line with the adjusted LLA methodology;
- Assess the Site specifically, in line with the adjusted LLA methodology;
- Identify whether the Site is considered suitable for potential release from the Green Belt for future development;
- Estimate the potential development capacity of the Site; and
- Compare the Site's suitability for Green Belt release with the following alternative sites in South Gloucestershire:
    - Land at Buckover, and
    - Land at Charfield.

1.2.2 This Study is structured broadly in line with its main objectives, as follows:

- Introduction;
- Planning and Legislation Background to the Study;
- Summary of Existing Green Belt Assessments, with Results of relevance to the Site;
- Critique of the Methodology used in the West of England Joint Spatial Plan Green Belt Assessment, November 2015; proposal for an Adjusted LLA Methodology;

- Re-assessment of Strategic Assessment Area 'Land to north-west of Winterbourne', in line with the Adjusted LLA Methodology;
- Site Assessment, in line with the Adjusted LLA Methodology;
- Suitability of the Site for Potential Release from the Green Belt for Future Development;
- Potential Development Capacity of the Site;
- Comparison of the Site's Suitability for Green Belt Release with Alternative Sites in South Gloucestershire; and
- Conclusion.

1.3 Methodology

1.3.1 For the sake of consistency, LLA's assessment of Cells 14 and 15 and the Site is undertaken broadly in line with the methodology adopted in the West of England Joint Spatial Plan (JSP) Green Belt Assessment, November 2015.

1.3.2 Certain limitations within the JSP methodology have, however, been identified in this report; they are discussed in detail in Section 4.1.

1.3.3 Therefore, LLA's methodology used for assessing Cells 14 and 15 and the Site represents an adjusted version (presented in Section 4.2) of the JSP methodology, to ensure a robust and thorough analysis is carried out. Methodology adjustments made are based on the professional judgement of a Chartered Landscape Architect with substantial experience of Green Belt assessments and are presented in a fully transparent manner within this report.

2 PLANNING AND LEGISLATION BACKGROUND TO THE STUDY

2.1 The National Planning Policy Framework (NPPF)

2.1.1 This assessment has been undertaken in the context of national policy set out in the National Planning Policy Framework (NPPF), 2012, which seeks continued protection of Green Belts. Paragraph 17 of the NPPF sets out core land use planning principles which should underpin both plan-making and decision-taking the fifth principle indicates that planning should: *'take account of the different roles and character of different areas, promoting the vitality of our main urban areas, protecting the Green Belts around them, recognising the intrinsic character and beauty of the countryside and supporting thriving rural communities within it'.*[1]

2.1.2 Section 9 of the NPPF explains that the government attaches great importance to Green Belts, stating: *'The fundamental aim of Green Belt policy is to prevent urban sprawl by keeping land permanently open; the essential characteristics of Green Belts are their openness and their permanence.'* [2]

2.1.3 The NPPF goes on to state that Green Belt serves five purposes. These are:

'1. To check the unrestricted sprawl of large built-up areas;

2. To prevent neighbouring towns merging into one another;

3. To assist in safeguarding the countryside from encroachment;

4. To preserve the setting and special character of historic towns; and

5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land.'[3]

2.1.4 The NPPF (paragraph 82) explains that the general extent of Green Belts across the country is already established and that boundaries are established in Local Plans.

[1] NPPF Para 17
[2] NPPF Para 79
[3] NPPF Para 80

Paragraph 83 states: *'Once established, Green Belt boundaries should only be altered in exceptional circumstances, through the preparation or review of the Local Plan. At that time, authorities should consider the Green Belt boundaries having regard to their intended permanence in the long term, so that they should be capable of enduring beyond the plan period.'* [4]

2.1.5 The NPPF confirms the approach Local Authorities should take when addressing Green Belt boundaries, in stating that, when doing so, local authorities should:

- *Ensure consistency with the Local Plan strategy for meeting identified requirements for sustainable development;*
- *Not include land which it is unnecessary to keep permanently open;*
- *Where necessary, identify areas of 'safeguarded land' between the urban area and the Green Belt, in order to meet longer-term development needs stretching well beyond the plan period;*
- *Make clear that the safeguarded land is not allocated for development at the present time. Planning permission for the permanent development of safeguarded land should only be granted following a Local Plan review which proposes the development;*
- *Satisfy themselves that Green Belt boundaries will not need to be altered at the end of the development plan period; and,*
- *Define boundaries clearly, using physical features that are readily recognisable and likely to be permanent.*

2.1.6 The NPPF encourages Local Authorities to plan positively to enhance the beneficial use of the Green Belt, by providing opportunities for access, outdoor sport and recreation, enhancing landscapes, visual amenity and biodiversity or improving damaged and derelict land. These land uses have been interpreted as exhibiting open characteristics which are an essential component of the Green Belt.

[4] NPPF Para 83

2.2 The South Gloucestershire Local Plan

2.2.1 The Site falls within the administrative area for South Gloucestershire, whose Local Plan currently comprises the following documents:

I. South Gloucestershire Local Plan Core Strategy 2006 – 2027;

II. West of England Joint Waste Core Strategy 2011;

III. South Gloucestershire Local Plan 2006 - 2011; and

IV. Minerals and Waste Local Plan 2002.

2.2.2 Relevant Green Belt policies from the South Gloucestershire Local Plan Core Strategy 2006 – 2027 (document i.), including 'Policy CS5 – Location of Development (inc. Green Belt)', are included in *Appendix C* (P46, 48-50).

2.2.3 Documents iii. and iv. above will cease to have effect when the council has adopted the Policies, Sites and Places (PSP) Plan, currently under preparation. This Plan will include development management policies, development sites and aspirations of local communities for their area, within the context set by the Core Strategy (i). above).

2.2.4 At a wider scale the West of England Joint Spatial Plan (JSP) 2016 – 2036 is being prepared to enable cooperation on planning issues that cross administrative boundaries. A draft format of the JSP was issued in November 2016. Relevant policies from the West of England JSP 2016 – 2036 are included in *Appendix D* (P30).

2.2.5 The South Gloucestershire New Local Plan 2016 – 2036 will detail the spatial objectives, locational strategy and planning policies - including new allocations for housing sites - in line with the requirements of the West of England JSP, together with the associated key social and physical infrastructure needed to support sustainable communities in South Gloucestershire until 2036.

2.3 The Bristol and Bath Green Belt: History and Extent

2.3.1 The Bristol and Bath Green Belt was broadly established in the mid-1950s through the Gloucestershire, Somerset and Wiltshire County Development Plans, with the

majority of the Bristol and Bath Green Belt falling within the Somerset authority area. The Green Belt designation was locally adopted in 1957 and given Ministerial approval in 1966.

2.3.2 The Avon County Structure Plan of 1985 defined the general extent of the Green Belt at that time with the detailed boundaries then defined in Local Plans.

2.3.3 The strategic Joint Structure Plan, 2002, defined the continued general extent of the Green Belt, showing it on a key diagram. As well as the overall aim of checking the growth of Bristol and Bath and preventing the merger of the two cities, emphasis was placed on preserving the setting and special character of villages and towns within the Green Belt. The Joint Structure Plan was revoked in 2010.

2.3.4 The West of England JSP 2016 - 2036, issued in draft form in 2016, indicates the current extent of the Bristol and Bath Green Belt (refer to *Figure 1: Extent of the Bristol and Bath Green Belt*). Its detailed boundaries are defined in the adopted local plans of each authority. With regard to the Site, the general extent of the Green Belt in South Gloucestershire is shown on the Key Diagram of the South Gloucestershire Local Plan Core Strategy 2006 – 2027 (refer to Figure 4: Key Diagram from the South Gloucestershire Local Plan Core Strategy 2006 – 2027), with detailed boundaries designated on the Policies Map. The JSP accepts that exceptional circumstances may exist, whereby the sustainability of Green Belt locations for development should be considered (such as at Coalpit Heath, Keynsam and South West Bristol).

2.3.5 The Bristol and Bath Green Belt today covers approximately 74,000 hectares and comprises approximately 48% of the West of England. It completely surrounds the city of Bath, and most of the Bristol urban area.

3 SUMMARY OF EXISTING GREEN BELT ASSESSMENTS, WITH RESULTS OF RELEVANCE TO THE SITE

3.1 Introduction

3.1.1 A number of assessments have already been published relating to the Bristol and Bath Green Belt, as well as to the Green Belt within South Gloucestershire more specifically; those assessments of most relevance to this study are discussed below.

3.2 The South Gloucestershire Strategic Green Belt Assessment, 2006

Study Methodology

3.2.1 This assessment comprised a strategic review of the Bristol and Bath Green Belt in South Gloucestershire.

3.2.2 South Gloucestershire was divided into 23 Strategic Assessment Areas (comprising diagrammatic, rather than pin point locations) and a commentary was produced concerning how each area fulfilled the Green Belt purposes (as identified in PPG2, and unchanged in the NPPF framework). The Site lies within Strategic Assessment Area 9 'Earthcott', refer to *Diagram 1: The South Gloucestershire – Strategic Green Belt Assessment: General Indication of the Strategic Assessment Areas* in *Appendix E* (P5).

3.2.3 The assessment did not consider detailed boundary changes to the Green Belt, nor did it identify areas of land proposed for release from the Green Belt for development.

Results of relevance to the Site

3.2.4 Strategic Assessment Area 9 'Earthcott' was scored as having all five Green Belt purposes fulfilled. The assessment sheet produced for Area 9: Earthcott is provided in *Appendix E* (P41).

3.3 South Gloucestershire Core Strategy Strategic Green Belt Assessment, December 2011

Study Methodology

3.3.1 This assessment also comprised a strategic review of the Bristol and Bath Green Belt in South Gloucestershire, building on the previous 2006 Assessment (outlined above). A two-stage analysis process was followed.

3.3.2 In Stage 1 Analysis, assessment sheets produced in the 2006 Assessment for the 23 Strategic Assessment Areas were used with further explanation. These sheets were used by assessors to record a commentary on how each strategic area fulfilled the Green Belt purposes against a prescribed methodology (refer to Table 1, *Appendix F* P7-9). As with the 2006 Assessment, the Site lies within Strategic Assessment Area 9 'Earthcott'. Diagram 2: Diagrammatic Representation of 2011 South Gloucestershire Strategic Green Belt Assessment of Purposes was produced (refer to *Appendix F* P11).

3.3.3 Stage 2 Analysis involved the consideration of a broader range of factors to assist in determining which areas of the Green Belt should be released. Each Strategic Assessment Area was tested against the broad constraints of:

1. Sustainability;
2. Environmental;
3. Infrastructure Availability / Delivery; and
4. Green Belt (established through Stage 1 Analysis).

(Refer to Table 3, *Appendix F,* P16)

3.3.4 Strategic Assessment Areas were grouped together by spatial characteristics, with Area 9 'Earthcott' falling into the 'North Fringe, outside of the motorway box' area.

Results of relevance to the Site

3.3.5 Under Stage 1 Analysis, Strategic Assessment Area 9 'Earthcott' was scored as having all five Green Belt purposes fulfilled (refer to Table 2: 2011 South

Gloucestershire Strategic Green Belt Assessment of Purposes – Summary, provided in *Appendix F*, P10).

3.3.6 Under Stage 2 Analysis, Area 9 was deemed to be an *"Unsustainable location due to severance caused by the motorway restricting connectivity within the Bristol conurbation. Limited public transport and limited opportunities for improvement"* (refer to Table 4B, covering Strategic Assessment Areas 4, 5, 9, 11, and 15, *Appendix F*, P20).

3.3.7 The concluding paragraph 7.6 of the Assessment stated: *"Long term consideration of the strategic extent of the Green Belt… cannot be divorced from the need to ensure that future development is delivered in the most sustainable locations in accordance with national government guidance"*.

3.4 The West of England Joint Spatial Plan (JSP) Green Belt Assessment, November 2015

3.4.1 The full West of England Joint Spatial Plan (JSP) Green Belt Assessment, November 2015, is provided in *Appendix G* of this Study. Sections of the Assessment of particular relevance to this study are discussed below.

Study Methodology

3.4.2 The objective of the West of England JSP Green Belt Assessment, November 2015, is to assess the Green Belt across the whole West of England area, comprising the administrative areas of Bristol, North Somerset, South Gloucestershire and Bath and North East Somerset. The assessment has been undertaken to provide part of the evidence base for the preparation of the West of England Joint Spatial Plan. It will help to inform the consideration of options for formulation of the spatial strategy in the Plan.

3.4.3 Paragraph 1.1 states that the document *"…provides a strategic assessment of the whole Green Belt across the plan area in relation to the purposes of Green Belts as set out in the NPPF. For the purposes of this study, the Green Belt has been divided into cells which have been assessed to determine which of the five purposes of Green Belt they serve, having regard to the essential characteristic of openness."*

3.4.4 Concerning definition of the cells, paragraph 4.1 of the Assessment states that: *"The Green Belt has been divided into 79 cells for the purposes of this assessment. They provide manageable areas for analysis and presentation of results. Cell definition reflects the need for the assessment to provide greater detail around the inner edges of the Green Belt and adjacent to larger urban areas. In those areas smaller cells have been defined compared to those in areas further from the larger built-up areas."*

3.4.5 The Site falls within Cell 14 in the West of England JSP Green Belt Assessment, November 2015 (refer to *Figure 2: Map of Cells within the Bristol and Bath Green Belt*). Cell 14 is assessed in the JSP Assessment in combination with its adjacent Cell 15 to the south-east, together referred to as 'Land to north-west of Winterbourne' (refer to *Figure 3: Extent of the Site, Cells 14 and 15*).

3.4.6 Cells are assessed against the five purposes of Green Belt set out in the NPPF. The form of analysis which was undertaken for each purpose is set out in Table 1: Application of the five purposes or methodology, together with a description and summary (refer to Table 1: Application of the five purposes or methodology, *Appendix G, P7-8*). Table 1 is also reproduced below for ease of reference:

Table 1: Application of the five purposes or methodology

National policy: Purposes of Green Belt	Cell analysis
1. To check the unrestricted sprawl of large built-up areas	Assessment of whether cell performs the purpose of checking the unrestricted sprawl of the Bristol and Bath built-up areas.
2. To prevent neighbouring towns merging into one another	Assessment of the cell and whether it prevents neighbouring towns merging into one another. Consideration of whether the cell contributes to purpose 2 by preserving the individual character, identity and setting of villages and hamlets within the Green Belt.
3. To assist in safeguarding the countryside from encroachment	Assessment of the cell and whether it performs the role of assisting in safeguarding the countryside from encroachment. Assessment informed by consideration of existing use and topography.
4. To preserve the setting and special character of historic towns	Assessment of the cell and whether it performs the role of preserving the setting and special character of historic towns. Consideration given to historic areas and their setting and special character with reference to settlements designated as or containing Conservation Areas.
5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land	Assessment of the cell and whether it performs the role of assisting urban regeneration. Noting that this purpose is served by all Green Belt areas, particular note is taken of the relationship of the cell with areas of urban regeneration.
Description and summary	An overall description of the features of each cell with particular reference to openness. Identification of any changes in the cell since the Green Belt was most recently designated in the Local Plan. A summary of whether the cell contributes to serving any of the five purposes.

3.4.7 A detailed critique of the methodology used in this Green Belt Assessment is provided in the following Section 4 of this report.

Results of relevance to the Site

3.4.8 The results for Cells 14 and 15 (together referred to as 'Land to north-west of Winterbourne') are indicated on P 20 of the West of England JSP Green Belt Assessment, November 2015, provided in *Appendix G.* They are also reproduced below for ease of reference:

Current JSP Green Belt Assessment Methodology Results

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	2 To prevent neighbouring towns merging into one another	3. To assist in safeguarding the countryside from encroachment	4. To preserve the setting and special character of historic towns	5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land	
14 & 15. Land to north-west of Winterbourne	✓ Checks sprawl of the built-up area.	x Maintains the separation of villages and settlements.	✓ Safeguards open countryside from encroachment.	x Cell 15 – defines edge of Winterbourne, preserves setting for Conservation Area around church.	✓	Primarily open land including a golf course, solar energy park and historic parkland. The M4 separates the cell from the built up area. Extensive urban area running north from central Bristol. The open landform is characterised by north/south running ridge and valley landscape. The Green Belt in this cell directly serves purposes 1, 3 and 5.

3.4.9 Cell 14 and 15 (together comprising 'Land to north-west of Winterbourne') is assessed as serving three of the five purposes of the Green Belt (1, 3 and 5), as follows:

- 1. To check the unrestricted sprawl of large built-up areas;
- 3. To assist in safeguarding the countryside from encroachment; and
- 5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land.

3.4.10 'Land to north-west of Winterbourne is assessed as not serving Purposes 2 & 4, i.e.:

- 2. To prevent neighbouring towns merging into one another; and
- 4. To preserve the setting and special character of historic towns.

3.4.11 A further direct extract of relevance to this Study from Section 5. Conclusions and further assessment of the West of England JSP Green Belt Assessment, November 2015, is provided below:

"Purposes of the Green Belt

5.2 As the cell assessment matrix shows, each cell directly serves two or more of the five purposes defined in the NPPF.

- *Sprawl of large built up areas*

5.3 The cells closest to the large built up areas of Bristol and Bath all directly serve the purpose of checking the unrestricted sprawl of these large built up areas. No areas of significant urban development have been identified in those cells. All cells maintain open, undeveloped land at the edge of these large built-up areas.

- *Prevent neighbouring towns merging*

5.4 Cells between a number of settlements perform the role of preventing neighbouring towns merging into one another. These include the cells in the following corridors:

- *Bristol, Keynsham, Saltford and Bath;*
- *Bristol, Winterbourne/ Frampton Cotterell/ Coalpit Heath, Yate/ Chipping Sodbury;*
- *Bristol and Thornbury*
- *Bristol Port/Bristol urban area and Portishead;*
- *Bristol, Long Ashton and Nailsea/Backwell*
- *Portishead and Clevedon*
- *Bath, Bradford on Avon and Trowbridge (outside the plan area)*

- *Safeguarding countryside from encroachment*

5.5 The description of each cell notes the dominance of countryside and the rural character of the areas. Most cells were identified as serving the purpose of safeguarding the countryside from further encroachment.

- *Preserving the setting and special character of historic towns*

5.6 All the cells surrounding the City of Bath (World Heritage Site) serve the purpose of preserving the setting and special character of historic towns. Cell 70, which provides a prominent open setting to the west of the group of conservation areas of central Bristol and Clifton, was also noted as serving this purpose. In many locations it was noted in the cell assessment that the Green Belt assisted in preserving the setting of designated Conservation Areas.

- *Assist in urban regeneration*

5.7 The role of the Green Belt in assisting urban regeneration is supported by policies in Local Plans which have regeneration objectives. All cells were identified as assisting in urban regeneration as they collectively encourage the recycling of derelict and other urban land in Bristol (including Avonmouth/ Severnside), Bath and the other settlements surrounded by Green Belt. The cells closest to the regeneration areas of south Bristol were specifically identified in the assessment matrix."

4 CRITIQUE OF THE METHODOLOGY USED IN THE WEST OF ENGLAND JOINT SPATIAL PLAN GREEN BELT ASSESSMENT, NOVEMBER 2015

4.1 Critique of the Methodology used in the West of England Joint Spatial Plan Green Belt Assessment, November 2015

4.1.1 Paragraph 1.1 of the JSP Assessment states that the document *"…provides a strategic assessment of the whole Green Belt across the plan area in relation to the purposes of Green Belts as set out in the NPPF. For the purposes of this study, the Green Belt has been divided into cells which have been assessed to determine which of the five purposes of Green Belt they serve, having regard to the essential characteristic of openness."*

LLA critique:

- It is acknowledged by the JSP Assessment that it provides a strategic level evaluation only.
- The methodology used enables a site to be assessed as either 'serving' or 'not serving' - there is no middle ground for sites that partially contribute to a Green Belt purpose. It is unclear how the methodology is applied if only a partial contribution to a purpose occurs, for example over part of a cell rather than its entirety.

4.1.2 Concerning definition of the cells, paragraph 4.1 of the Assessment states that: *"The Green Belt has been divided into 79 cells for the purposes of this assessment. They provide manageable areas for analysis and presentation of results. Cell definition reflects the need for the assessment to provide greater detail around the inner edges of the Green Belt and adjacent to larger urban areas. In those areas smaller cells have been defined compared to those in areas further from the larger built-up areas."*

LLA critique:

- It is acknowledged by the JSP Assessment that manageability (presumably in terms of resources available to undertake the Assessment) has influenced the selection of cells.
- The methodology used appears to enable a short cut way of assessing all parcels in one stage, rather than considering broader areas first, before looking in more detail at sub-divided areas which are considered to demand further evaluation.

4.1.3 The Site falls within Cell 14 in the JSP Assessment. Cell 14 is assessed in combination with its adjacent Cell 15 to the south-east, together referred to as 'Land to north-west of Winterbourne'.

LLA critique:

- No explanation is provided as to why Cells 14 are identified as separate entities on the plan, yet merged together to be assessed as one area.
- Cells 14 and 15 cover a large area, over which considerable variation occurs with regard to the landscape resource (landscape fabric and landscape character) and visual amenity.

4.1.4 Under paragraph 4.5 of the JSP Assessment the form of analysis which was undertaken is set out in Table 1: Application of the five purposes or methodology, together with a description and summary.

LLA's critique on the suitability of the methodology inherent within this table are provided within the table as follows:

Table 1: Application of the five purposes or methodology, with LLA critique

National policy: Purposes of Green Belt	Cell analysis
1. To check the unrestricted sprawl of large built-up areas	Assessment of whether cell performs the purpose of checking the unrestricted sprawl of the Bristol and Bath built-up areas. LLA critique: • Purpose 1 seems to be primarily focussed on Bristol and Bath built-up areas - there appears to be little consideration of other towns and built up areas, which should also be considered, in line with NPPF Purpose 1. • Omission of these built elements could influence the scoring.
2. To prevent neighbouring towns merging into one another	Assessment of the cell and whether it prevents neighbouring towns merging into one another. Consideration of whether the cell contributes to purpose 2 by preserving the individual character, identity and setting of villages and hamlets within the Green Belt. LLA critique: • NPPF Purpose 2 relates to towns by definition, however, the JSP Green Belt Assessment also refers also to villages and hamlets - these are not towns by definition. • Inclusion of villages and hamlets within the process could influence/skew the scoring, since villages may be included that are washed over by the Green Belt, as well as those that are excluded. • The methodology requires further detail here, if villages and hamlets are to be included, to demonstrate that this inclusion has been undertaken carefully.

National policy: Purposes of Green Belt	Cell analysis
3. To assist in safeguarding the countryside from encroachment	Assessment of the cell and whether it performs the role of assisting in safeguarding the countryside from encroachment. Assessment informed by consideration of existing use and topography. <u>LLA critique:</u> • Insufficient detail is provided as to how Purpose 3 is assessed. • Consideration of "existing use and topography" is inadequate - encroachment is defined in part by potential contribution to both physical and visual openness, which should be acknowledged within the methodology.
4. To preserve the setting and special character of historic towns	Assessment of the cell and whether it performs the role of preserving the setting and special character of historic towns. Consideration given to historic areas and their setting and special character with reference to settlements designated as or containing Conservation Areas. <u>LLA critique:</u> • A broader definition of historic areas is required here, not just encompassing settlements designated as or containing Conservation Areas. • The methodology should be amended here to assess effects on *parts* of an historic area. Modern development may have subsumed a historic core, however, the methodology provides no opportunity for perception of effect on *part* of an historic area, only on the settlement as a whole which is designated as or contains a Conservation Area.
5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land	Assessment of the cell and whether it performs the role of assisting urban regeneration. Noting that this purpose is served by all Green Belt areas, particular note is taken of the relationship of the cell with areas of urban regeneration.
Description and summary	An overall description of the features of each cell with particular reference to openness.

National policy: Purposes of Green Belt	Cell analysis
	Identification of any changes in the cell since the Green Belt was most recently designated in the Local Plan. A summary of whether the cell contributes to serving any of the five purposes. <u>LLA critique:</u> • The methodology used enables a site to be assessed as either 'serving' or 'not serving' - there is no middle ground for sites that partially contribute to a Green Belt purpose. It is unclear how the methodology is applied if only a partial contribution to a purpose occurs, for example over part of a cell rather than its entirety.

4.1.5 Under section 5. Conclusions and further assessment of the JSP Green Belt Assessment, paragraph 5.2 states that *"As the cell assessment matrix shows, each cell directly serves two or more of the five purposes detailed in the NPPF"*.

<u>LLA critique:</u>

- The methodology used enables a site to be assessed as either 'serving' or 'not serving' - there is no middle ground for sites that partially contribute to a Green Belt purpose. It is unclear how the methodology is applied if only a partial contribution to a purpose occurs, for example over part of a cell rather than its entirety.

4.1.6 Under Sprawl of large built up areas, paragraph 5.3 states *"The cells closest to the large built up areas of Bristol and Bath all directly serve the purpose of checking the unrestricted sprawl of these large built up areas. No areas of significant urban development have been identified in those cells. All cells maintain open, undeveloped land at the edge of these large built-up areas."*

4.1.7 <u>LLA critique:</u>

- It is not considered the case that *"all cells maintain, open undeveloped land at the edge of these large built up areas"*. Various areas are enclosed and/or demonstrate an urban fringe character.

4.2 Proposal for an Adjusted LLA Methodology;

4.2.1 Based on the LLA critique within the previous Section 4.1 of this report, a LLA adjusted version of Table 1: Application of the five purposes or methodology is recommended and provided overleaf:

LLA Adjusted Version of Table 1: Application of the five purposes or methodology

National policy: Purposes of Green Belt	Cell analysis
1. To check the unrestricted sprawl of large built-up areas	Assessment of whether cell performs the purpose of checking the unrestricted sprawl of the Bristol and Bath built-up areas, as well as other towns and built up areas.
2. To prevent neighbouring towns merging into one another	Assessment of the cell and whether it prevents neighbouring towns merging into one another. Consideration of whether the cell contributes to purpose 2 by preserving the individual character, identity and setting of neighbouring towns within the Green Belt.
3. To assist in safeguarding the countryside from encroachment	Assessment of the cell and whether it performs the role of assisting in safeguarding the countryside from encroachment. Assessment informed by consideration of existing use and topography, as well as potential contribution to both physical and visual openness.
4. To preserve the setting and special character of historic towns	Assessment of the cell and whether it performs the role of preserving the setting and special character of historic towns. Consideration given to historic areas (whole or in part)and their setting and special character, including with reference to settlements designated as or containing Conservation Areas.
5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land	Assessment of the cell and whether it performs the role of assisting urban regeneration. Noting that this purpose is only served by previously developed, derelict or recycled sites.
Description and summary	An overall description of the features of each cell with particular reference to openness. Identification of any changes in the cell since the Green Belt was most recently designated in the Local Plan.

National policy: Purposes of Green Belt	Cell analysis
	A summary of whether the cell (in whole or in part) contributes to serving any of the five purposes.

5 RE-ASSESSMENT OF STRATEGIC ASSESSMENT AREA 'LAND TO NORTH-WEST OF WINTERBOURNE, IN LINE WITH THE ADJUSTED LLA METHODOLOGY

5.1 Re-assessment of Strategic Assessment Area 'Land to north-west of Winterbourne'

5.1.1 As previously discussed, the Site occupies a small portion of Strategic Assessment Area 'Land to north-west of Winterbourne', which comprises Cells 14 and 15 in the JSP Green Belt Assessment.

5.1.2 Based on the adjusted LLA methodology (presented in the LLA adjusted version of Table 1: Application of the five purposes or methodology, provided in Section 4.2 of this report), Strategic Assessment Area 'Land to north-west of Winterbourne' has been re-assessed as follows:

Re-assessment of Strategic Area 'Land to north-west of Winterbourne', in line with the Adjusted LLA Methodology

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	2 To prevent neighbouring towns merging into one another	3. To assist in safeguarding the countryside from encroachment	4. To preserve the setting and special character of historic towns	5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land	
14 & 15. Land to north-west of Winterbourne	✓ Western and north-western parts of the cell check the unrestricted sprawl of Bristol built-up area.	x Cell does not influence the separation of / physical or visual gap between towns, e.g. Thornbury with Yate and Chipping Sodbury.	✓ Parts of the cell – those of rural land use, with natural topography and open views - safeguard open countryside from encroachment.	✓ The southern and south-western parts of the cell define the edge of Winterbourne and preserve the setting and special character of Church Lane Winterbourne Conservation Area surrounding St Michael's Church.	✓	Existing use is primarily – though not exclusively – open countryside, including historic parkland. The cell includes a golf course and solar energy park. Some northern and western parts of the cell demonstrate an urban fringe character. The M4 directly adjacent to the west separates the cell from the Bristol built-up area. The open topography is generally characterised by a natural north/south running ridge and valley landscape. Views are generally open, with localised enclosure created by artificial motorway bunds. Parts of this cell serve Green Belt purposes 1, 3, 4 and 5.

5.2 Results of Re-assessment

5.2.1 Under the revised LLA methodology, parts of the 'Land to north-west of Winterbourne' are assessed as serving four of the five purposes of the Green Belt (1, 3, 4 and 5), as follows:

- 1. To check the unrestricted sprawl of large built-up areas;
- 3. To assist in safeguarding the countryside from encroachment; and
- 4. To preserve the setting and special character of historic towns; and
- 5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land.

5.2.2 'Land to north-west of Winterbourne' is assessed as not serving Purpose 2, i.e.:

- 2. To prevent neighbouring towns merging into one another.

6 SITE ASSESSMENT, IN LINE WITH THE ADJUSTED LLA METHODOLOGY

6.1 Site Assessment

6.1.1 Since the Site covers such a small portion of the overall Strategic Assessment Area 'Land to north-west of Winterbourne', and is considered to represent a significant departure from the remainder of that landscape in terms of its landscape resource, and physical and visual enclosure, an assessment on the Site area only is deemed relevant in this Study, as follows.

Site Assessment, in line with the Adjusted LLA Methodology

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	2 To prevent neighbouring towns merging into one another	3. To assist in safeguarding the countryside from encroachment	4. To preserve the setting and special character of historic towns	5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land	
The Site at Woodlands	✓ The Site checks the unrestricted sprawl of Bristol built-up area.	x Due to the Site's location, it does not influence the separation of / physical or visual gap between towns, e.g. Thornbury with Yate and Chipping Sodbury.	x The Site is a golf course within Bristol's urban fringe, abutting the M4/ M5 motorways, on land that is physically and visually contained by man-made features (primarily). The Site, therefore, does not assist in safeguarding open countryside from encroachment (particularly when compared with alternative sites being assessed for development – ref LSC Dec 2016).	x The Site does not contribute towards defining the edge of Winterbourne nor preserving the setting and special character of Church Lane Winterbourne Conservation Area surrounding St Michael's Church.	✓	Existing use is a golf course, with northern and western parts of the Site demonstrating an urban fringe character. The M4 directly adjacent to the west separates the Site from the Bristol built-up area. The topography is artificial. The Site is generally physically and visibly contained. This cell serves Green Belt purposes 1 and 5.

6.2 Results of Re-assessment

6.2.1 Under the LLA methodology, The Site is assessed as serving two of the five purposes of the Green Belt (1 and 5), as follows:

- 1. To check the unrestricted sprawl of large built-up areas; and
- 5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land.

6.2.2 The Site is assessed as not serving Purposes 2, 3, and 4, i.e.:

- 2. To prevent neighbouring towns merging into one another;
- 3. To assist in safeguarding the countryside from encroachment;
- 4. To preserve the setting and special character of historic towns; and

7 CONCLUSION

7.1.1 This Green Belt Review has identified various limitations in the methodology used for the West of England JSP Green Belt Assessment, not least of which is the large size of cell within which the Site lies, within which considerable variation occurs with regard to the landscape resource, and physical and visual containment. The Site is considered to represent a significant departure from the remainder of the landscape within Cells 14 and 15 in these terms.

7.1.2 From the Site-specific assessment made by LLA in this report, based on an adjusted methodology, it is considered that the Site would not cause significant harm to the Green Belt should it be released for low-rise, medium/low-density residential development. The results of LLA's associated Landscape and Sensitivity Capacity Study indicate that land at Woodlands has a Medium to High capacity to accommodate development and is more suitable for such a purpose than other sites in South Gloucestershire which were analysed for comparison.

7.1.3 Due to the Site's location, as well as its existing landscape and visual characteristics, it is considered that the Site would provide a logical and sustainable extension to the city of Bristol. Development of the Green Belt adjacent to Bristol is considered to be an acceptable proposition for this Site, particularly when compared to similar sites.

Stansted:
Unit 1, The Exchange,
9 Station Road, Stansted, CM24 8BE

t +44 (0)1279 647044
e office@lizlake.com
www.lizlake.com

Bristol:
1 Host Street,
Bristol, BS1 5BU

t +44 (0)117 927 1786

Nottingham:
Sutton Place, 49 Stoney St,
Nottingham NG1 1LX

t +44 (0)115 784 3566

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS

- Landscape Design
- Urban Design
- Residential
- Public Realm
- Masterplanning
- Landscape Planning
- Heritage Landscapes
- Gardens and Estates
- Restoration and Conversion
- Places of Worship
- Expert Witness
- Hospitality
- Education
- Retail / Office
- Community
- Ecology
- Arboriculture
- 3D / Graphic Design

Appendix A

WOODLANDS GARDEN VILLAGE, BRISTOL

GREEN BELT REVIEW: SITES AND BOUNDARIES STUDY

FIGURES 1 - 6

December 2016

FIGURE 1: EXTENT OF THE BRISTOL AND BATH GREEN BELT – TAKEN FROM THE WEST OF ENGLAND JOINT SPATIAL PLAN GREEN BELT ASSESSMENT, NOVEMBER 2015.

FIGURE 2: MAP OF CELLS WITHIN THE BRISTOL AND BATH GREEN BELT – TAKEN FROM THE WEST OF ENGLAND JOINT SPATIAL PLAN GREEN BELT ASSESSMENT, NOVEMBER 2015.

FIGURE 3: EXTENT OF THE SITE, CELLS 14 AND 15 – CELLS TAKEN FROM THE WEST OF ENGLAND JOINT SPATIAL PLAN GREEN BELT ASSESSMENT, NOVEMBER 2015.

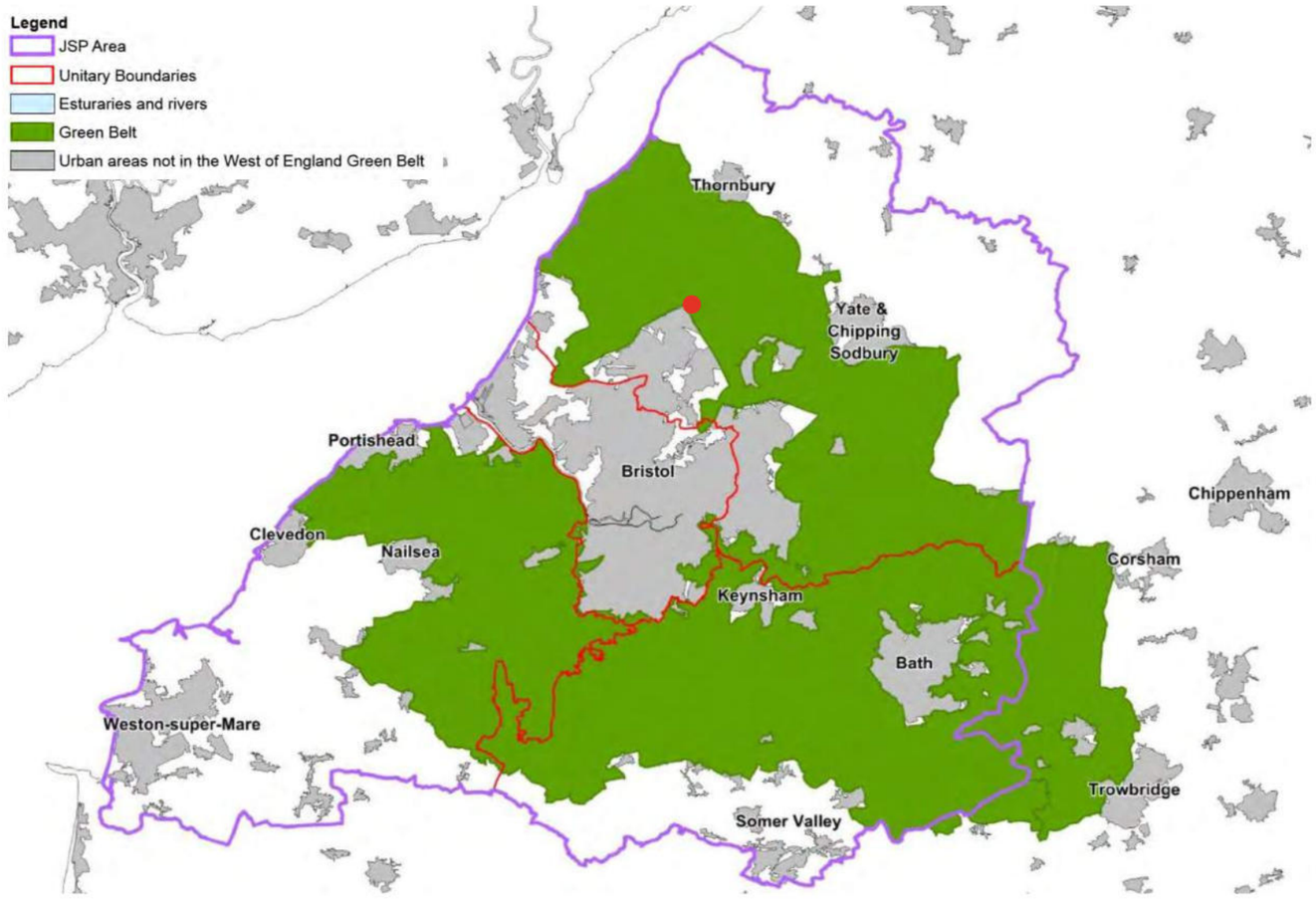
FIGURE 4: KEY DIAGRAM FROM THE SOUTH GLOUCESTERSHIRE LOCAL PLAN CORE STRATEGY 2006 – 2027.

FIGURE 5: AERIAL PHOTOGRAPH.

FIGURE 6: LANDSCAPE CHARACTER AREAS – TAKEN FROM SOUTH GLOUCESTERSHIRE LANDSCAPE CHARACTER ASSESSMENT, 2013.

Joint Spatial Plan Green Belt Assessment November 2015

Figure 1 – Bristol Bath Green Belt



Key:

Location of the Site

Project: Woodlands Garden Village, Bristol

Client: [redacted]

Date: December 2016

Status: Planning

N

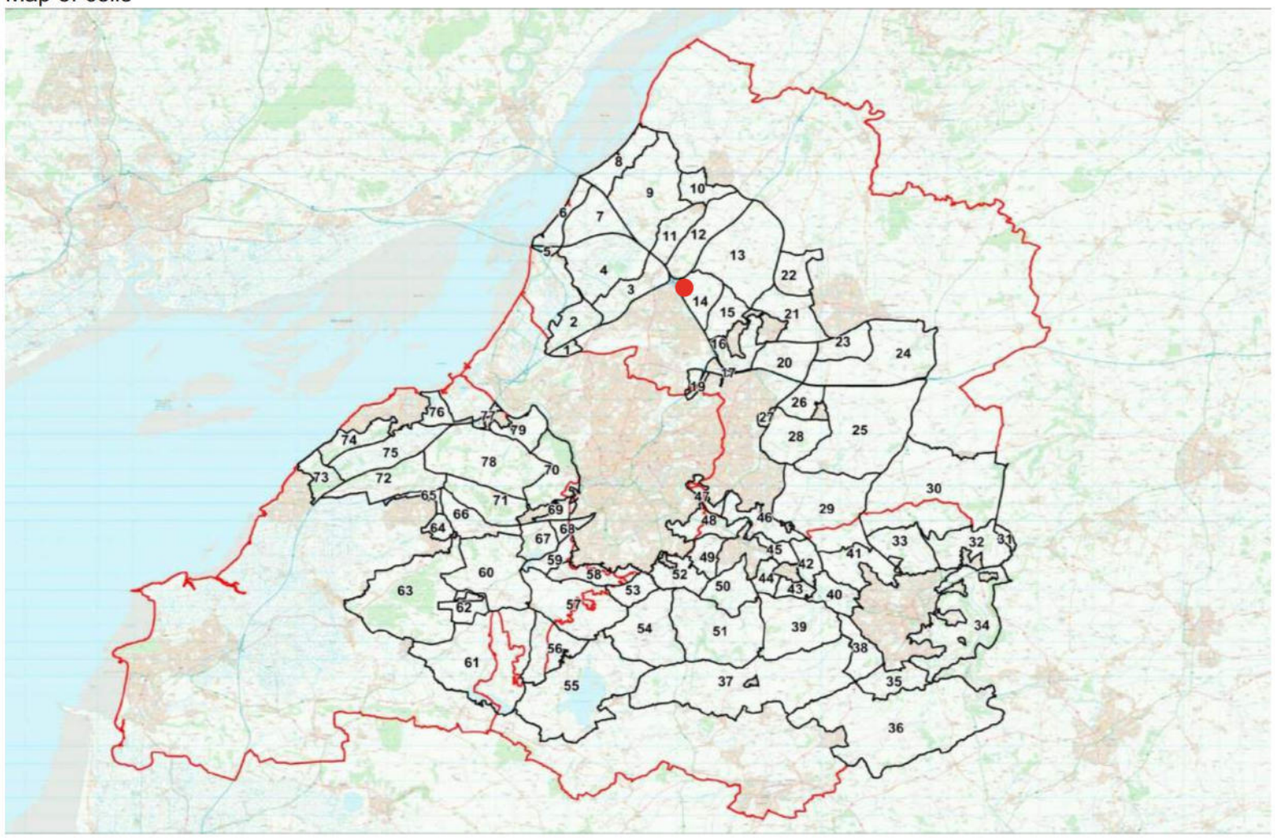
© COPYRIGHT LIZ LAKE ASSOCIATES Reproduced from Ordnance Survey map data by permission of Ordnance Survey © Crown copyright 2015 Licence No.100007196
© Crown copyright and database rights 2015 Ordnance Survey Licence No.0100031673

1878 Figure 2

Map of Cells within the Bristol and Bath Green Belt - taken from the West of England Joint Spatial Plan Green Belt Assessment, November 2015

Appendix 1 – Assessment Matrix

Map of cells



Key:

Location of the Site

Project: Woodlands Garden Village, Bristol

Client [redacted]

Date: December 2016

Status: Planning

N

© COPYRIGHT LIZ LAKE ASSOCIATES Reproduced from Ordnance Survey map data by permission of Ordnance Survey © Crown copyright 2015 Licence No.100007196
© Crown copyright and database rights 2015 Ordnance Survey Licence No.0100031673

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS
office@lizlake.com www.lizlake.com

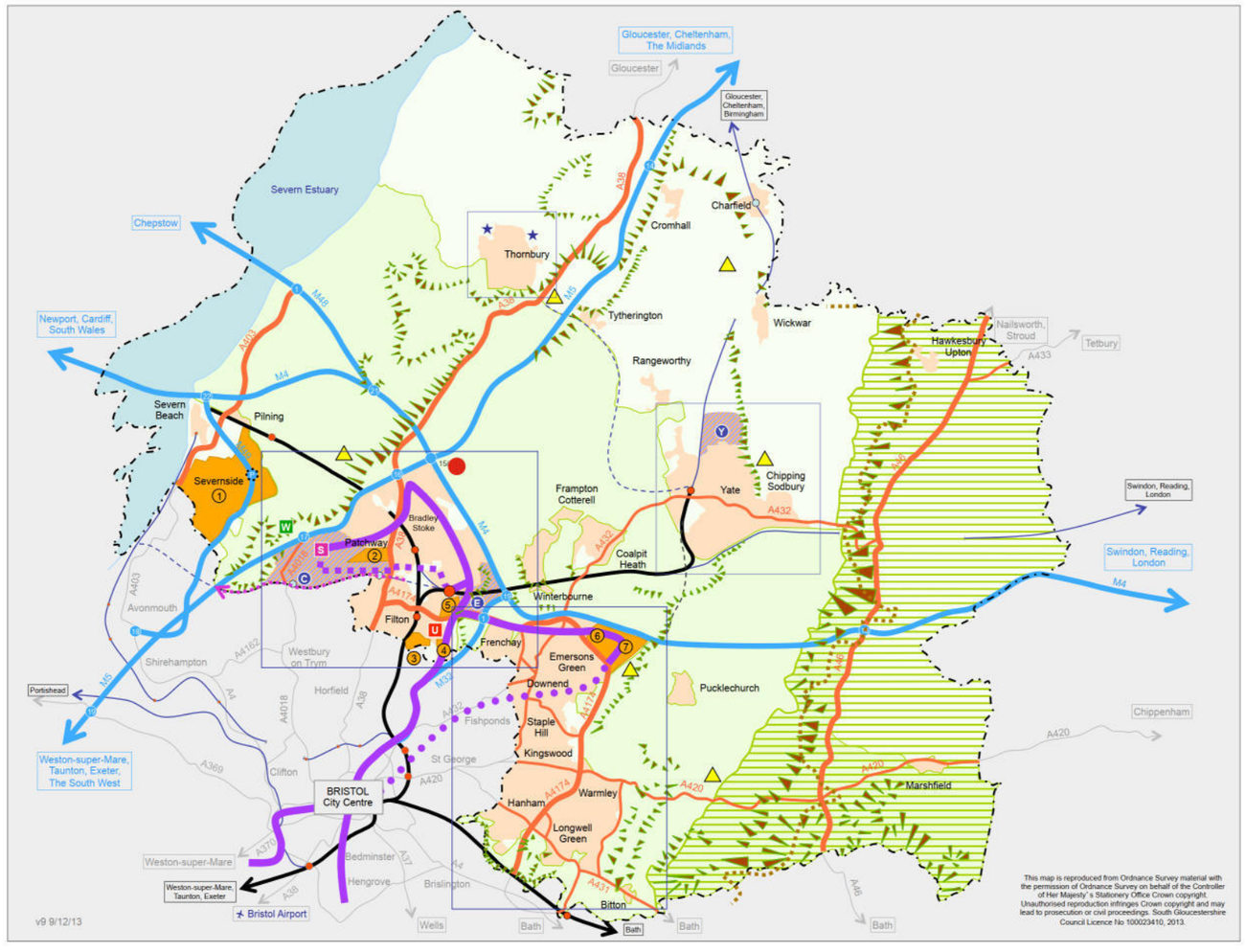
Extent of the Site, Cells 14 and 15 - Cells taken from the West of England Joint Spatial Plan Green Belt Assessment, November 2015


Tockington
Rudgeway
ALVESTON CP
Almondsbury
Aztec West
Patchway
Bradley Stoke
Little Stoke
Bradley Stoke CP
Earthcott Green
Latteridge
Iron Acton CP
Frampton Cotterell
Frampton Cotterell CP
North Corner
Winterbourne
Winterbourne CP
Watley's End
Woodlands Golf & Country Club
Tockington Park Farm
Tockington Park Wood
Woodhouse Down
Hortham Wood
Hortham Farm
Ringhurst Farm
Oldfield Farm
Earthcottgreen Old Farm
Gaunt's Earthcott
Colony Farm
Woodlands Wood
Corporation Wood
Brickhouse Farm
Gloucester Road Farm
Perrinpit Farm
Kingmore Farm
Old Withy Bed
Grange Court Farm
The Grange Hotel
Hammond Court Farm
Leyland Court Farm
Northwood Farm
Ferndale Farm
Green Acres Farm
Court Farm
Solar Farm
North Wood
Kites Hill
Pits Hill
Latteridge Hill
Sheephouse Farm
Tanners Farm
Sunbeam Nurseries
Playing Fields
Coisters
Flaxpits
Hicks Common
Ashfield Farm
Angers Farm
Whitehouse Farm
Lark's Farm
Lower Lark's Farm
Stockhill Cottage
Emlett Farm
Gate Farm
Ladden Bows Bridge
Laddenside Farm
Cog Mill Farm
Brake Farm
Framptonend Farm
Woodcock Hill
Lower Woodhouse Farm
Woodhouse
Fernhill Farm
Meerbrook Cottage
Lower Court Farm
Oakleaze
Silverhill Brake
Gatten's Brake
Harts
Ashfield Farm
Southview Farm
Oldfields Lane
Old Church Road
Perrinpit Road
Frogland Cross
Folly Farm
South View
Laddenside Farm
Elm Farm
Ford
Brake Farm
Cog Mill Farm
Bristol Road
Frampton End Road
Hearse Lane (Track)
Weir
Air Shaft (disused)
Framptonend Farm
Playing Field
Frampton Court
Parsonage Bridge
Nightingale's Bridge
Blackberry Brake
Woodlands Farm
Frome Valley Walkway
Old Gloucester Road
French Lane
Swan Lane
Church Lane
High Lane (Track)
Langley
Matford Bridge
Hertroost Farm
Monk's Pool
Oakdale
Firles
Savage's Wood
Three Brooks Nature Reserve
Bradley Stoke Community Forest Path
Sherborne Brake
Stoke Bridge
Filton Bridge
Patchway Playing Field
Patchway Sta
Pol Sta
Offices
Superstore
Tunnels
Air Shaft
Sewage Works
Meerbrook Cottage
Cemy
Sports Ground
Oaklands
Almondsbury Hill
Hotel
Moor Lane
Tockington Lane
Fernhill
Woodhouse
The Roundabout
Port Farm
Awkley Hill
Rudgeway Farm
Willis Brake
Gorse Covert
Hill Road
Ringhurst Farm
Green Farm
Chapel (rems of)
Court Farm
Colony Farm
Hortham Farm
Hortham Wood
Woodhouse Down
Tockington Park Wood
Tockington Park Farm
Gatten's Brake
Harts
Ashfield Farm
Southview Farm
Oldfields Lane
Old Church Road
Earthcott Green
Whitehouse Farm
Earthcottgreen Farm
Earthcottgreen Old Farm
Oldfield Farm
Latteridge Hill
Latteridge
Kites Hill
Pits Hill
Sheephouse Farm
Lark's Farm
Lower Lark's Farm
El Sub Sta
Stockhill Cottage
Emlett Farm
Gate Farm
Lark's Lane
Latteridge Lane
Ladden Bows Bridge
Acton Co
Laddenside Farm
Elm Farm
Ford
Brake Farm
Cog Mill Farm
Bristol Road
Frampton End Road
Hearse Lane (Track)
Weir
Air Shaft (disused)
Framptonend Farm
Framp
Playing Field
Frampton Court
Parsonage Bridge
Nightingale's Bridge
Frampton Cotterell
Blackberry Brake
Woodlands Farm
Frome Valley Walkway
Tanners Farm
Sunbeam Nurseries
Playing Fields
Coisters
Flaxpits
Hicks Common
Winterbourne
Watley's End
Folly Farm
South View

Key Diagram - taken from the South Gloucestershire Local Plan Core Strategy 2006 - 2027

Key:

Location of the Site



Key Diagram

South Gloucestershire Local Plan: Core Strategy adopted December 2013

2006 – 2027

www.southglos.gov.uk

© South Gloucestershire Council. All rights reserved LA 100023410, 2014

Key

- South Gloucestershire Council Boundary
- Green Belt Area
- Cotswold AONB
- Open Countryside (not Green Belt or AONB)
- Visually Important Hillsides
- Severn Estuary
- Main Built Up Areas

Transport

- Motorways
- Proposed M49 Junction
- Major Roads
- Other main roads
- Railway Stations
- Passenger Railway
- Freight Railway
- Re-introduction of passenger services - Rail
- Proposed Greater Bristol Metro (MetroWest)
- Rail: Safeguarded Station Sites (Charfield, Filton & Henbury)
- North Fringe to Hengrove Package (MetroBus)
- Proposed MetroBus extension (indicative alignment)
- Future potential MetroBus extension (indicative alignment)
- Cotswold Way
- Regional Shopping Centre
- University of the West of England
- Wildlife Park
- Active Mineral Sites

SGLP Committed Sites:

1. Severnside
2. Filton Northfield (Charlton Hayes)
3. Wallscourt Farm (Cheswick)
4. Land East of Coldharbour Lane
5. Harry Stoke
6. Science Park
7. Emersons Green East

New Neighbourhood Areas:

- Cribbs/Patchway
- East of Harry Stoke
- North Yate
- Thornbury Housing Opportunity areas

Project: Woodlands Garden Village, Bristol

Client: [redacted]

Date: December 2016

Status: Planning

N

© COPYRIGHT LIZ LAKE ASSOCIATES Reproduced from Ordnance Survey map data by permission of Ordnance Survey © Crown copyright 2015 Licence No.100007196
© Crown copyright and database rights 2015 Ordnance Survey Licence No.0100031673

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS
office@lizlake.com www.lizlake.com

Aerial Photograph



Legend

The Site

Existing Urban Areas and Settlements

Church Lane Winterbourne Conservation Area

Cells taken from the West of England Joint Spatial Plan Green Belt Assessment, November 2015

Cell 14

Cell 15

Project: Woodlands Garden Village, Bristol

Client: [redacted]

Date: December 2016

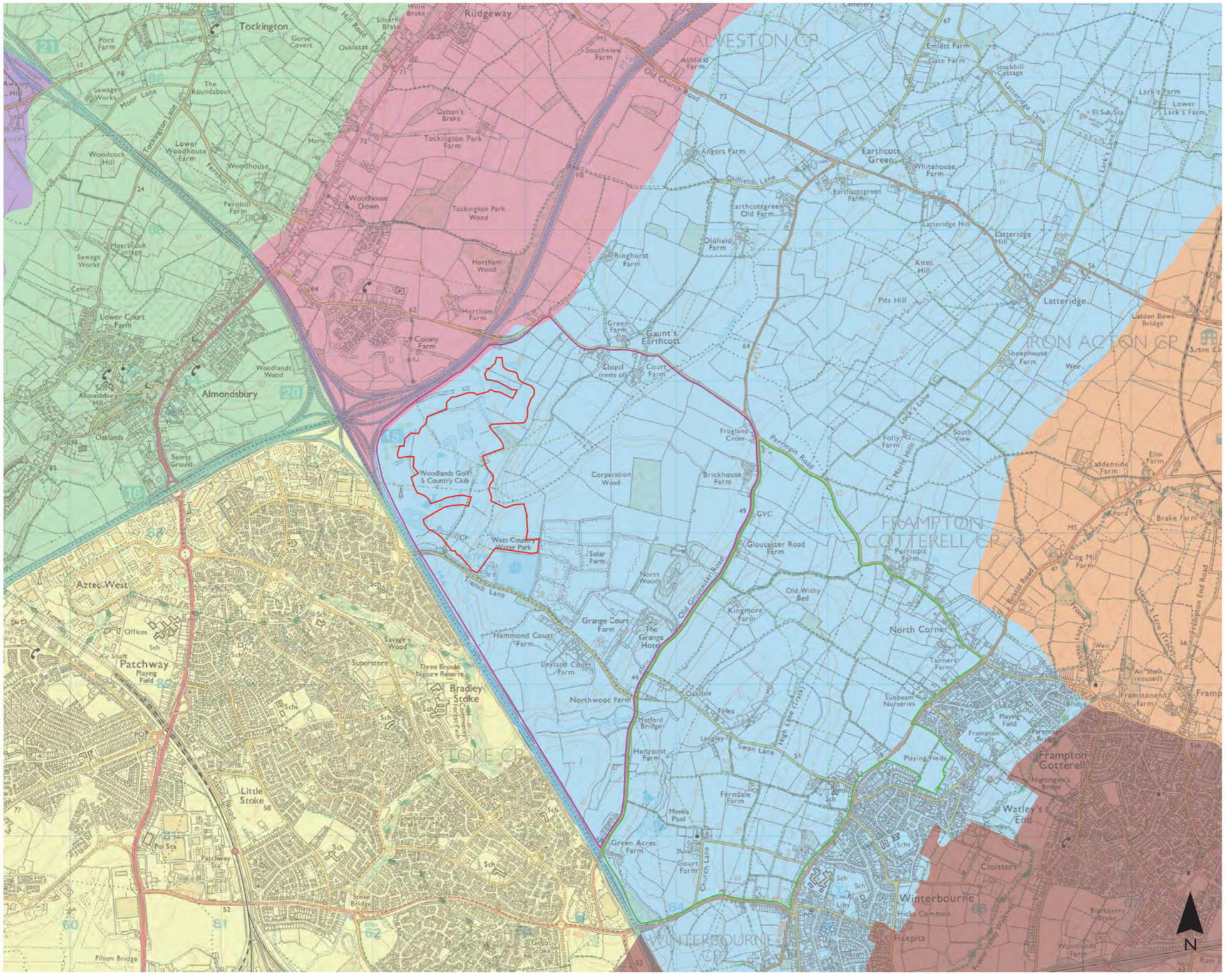
Scale: 1:25,000 @ A3

Status: Planning

© COPYRIGHT LIZ LAKE ASSOCIATES Reproduced from Ordnance Survey map data by permission of Ordnance Survey © Crown copyright 2016 Licence No.100007196
© Crown copyright and database rights 2016 Ordnance Survey Licence No.0100031673

LIZ LAKE ASSOCIATES
LANDSCAPE ARCHITECTS
office@lizlake.com www.lizlake.com

Landscape Character Areas - taken from South Gloucestershire Landscape Character Assessment, 2013



Legend

The Site

Cells taken from the West of England Joint Spatial Plan Green Belt Assessment, November 2015

Cell 14

Cell 15

Landscape Character Areas - taken from South Gloucestershire Landscape Character Assessment (2013):

Earthcott Vale (10)

Patchway & Filton (15)

Rudgeway & Tytherington Ridge (17)

Severn Ridges (18)

Project: Woodlands Garden Village, Bristol

Client: [redacted]

Date: December 2016

Scale: 1:25,000 @ A3

Status: Planning

© COPYRIGHT LIZ LAKE ASSOCIATES Reproduced from Ordnance Survey map data by permission of Ordnance Survey © Crown copyright 2016 Licence No.100007196
© Crown copyright and database rights 2016 Ordnance Survey Licence No.0100031673

Stansted:
Unit 1, The Exchange,
9 Station Road, Stansted, CM24 8BE

t +44 (0)1279 647044
e office@lizlake.com
www.lizlake.com

Bristol:
1 Host Street,
Bristol, BS1 5BU

t +44 (0)117 927 1786

Nottingham:
Sutton Place, 49 Stoney St,
Nottingham NG1 1LX

t +44 (0)115 784 3566

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS

- Landscape Design
- Urban Design
- Residential
- Public Realm
- Masterplanning
- Landscape Planning
- Heritage Landscapes
- Gardens and Estates
- Restoration and Conversion
- Places of Worship
- Expert Witness
- Hospitality
- Education
- Retail / Office
- Community
- Ecology
- Arboriculture
- 3D / Graphic Design

Appendix B

WOODLANDS GARDEN VILLAGE, BRISTOL

GREEN BELT REVIEW: SITES AND BOUNDARIES STUDY

UDB'S CONCEPT MASTERPLAN FOR WOODLANDS (PRELIMINARY DRAFT, DECEMBER 2016)

December 2016

Development Strategy

Movement:

- Access to the site is from Trench Lane in the south which leads on to a central lane within the development that arrives at the local centre before winding north and connecting with Gaunt's Earthcott Lane.
- A number of pedestrian access points which exist have been connected and supplemented with additional routes to reinforce pedestrian connectivity and create new circular walks.
- The street network acknowledges exising pedestrian routes and pre-existing field patterns - many of which correspond with footpaths.
- Potential bus link through site with options for stops to ensure that all dwellings are comfortable within 400m of a bus stop.

Landscape:

- Existing hedges and trees retained as far as possible to boundaries and within ecological woodland areas as green links which contribute to POS. Use of the field network allows retention of many exisitng tree belts.
- A number of trees within the site retained as woodland green corridors and community woodland areas, including a dense woodland corridor along the banks of Hortham Brook.
- Hortham Brook retained within a wide green corridor which includes amenity open space, allotments and ecological areas.

Community:

- Local Centre is central within the site and includes retail, community facilities and a primary school, all centred around a focal green. Potential for high density mixed use development.
- Buildings address POS with shared space / private drive frontage to promote quiet streets.
- All green spaces have frontages overlooking them to provide natural surveillance.
- High density development typically overlooking central community park with more fragmented development block along the edges, particularly to the north and east which form a a green edge to the development.

Masterplan Legend

- Development Boundary
- Access - all modes
- Access - pedestrian / cycle
- Pedestrian / cycle routes proposed
- Pedestrian routes existing
- private drives
- key spaces
- Potential bus stop locations
- potential bus route through site
- Hedges / Trees retained
- Potential Ecological Planting
- Play / kick-about areas
- Amenity Public Open Space
- Strategic Open Space
- Potential Allotment Area
- Retained Water Area
- Proposed Attenuation Area
- Key buildings / indicative built frontage

Schedule of Masterplan areas:		
Gross red line area:	108ha	--
Net Residential Development: 50ha x 40/ha = 2000 units	**50ha**	
2-3 Form Entry Primary School Site	2.8ha	
Amenity Public Open Space,	13ha	
Woodland, hedges and Strategic Open Space	37.6	
attenuation (incl in above)	2.75ha plus northern ponds	
non-developed (incl roads, single frontage, private drives)		

1:1,2500
0 100 200m

client: [redacted]
project: Woodlands, Bristol
drawing title: Concept Masterplan
working draft
urbandesignbox.co.uk
Copyright of Urban Design Box. This drawing is for illustrative purposes only and should not be used for any construction or estimation purposes. No liability or responsibility is accepted arising from reliance upon the information contained within this drawing. DO NOT SCALE DRAWINGS.
job number: SWS103
drawing number: 3201
scale: 1:2500@A0
drawn: jvs
date: December 2016
status: preliminary draft
Urban Design Box

Stansted:
Unit 1, The Exchange,
9 Station Road, Stansted, CM24 8BE

t +44 (0)1279 647044
e office@lizlake.com
www.lizlake.com

Bristol:
1 Host Street,
Bristol, BS1 5BU

t +44 (0)117 927 1786

Nottingham:
Sutton Place, 49 Stoney St,
Nottingham NG1 1LX

t +44 (0)115 784 3566

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS

- Landscape Design
- Urban Design
- Residential
- Public Realm
- Masterplanning
- Landscape Planning
- Heritage Landscapes
- Gardens and Estates
- Restoration and Conversion
- Places of Worship
- Expert Witness
- Hospitality
- Education
- Retail / Office
- Community
- Ecology
- Arboriculture
- 3D / Graphic Design

Appendix C

WOODLANDS GARDEN VILLAGE, BRISTOL

GREEN BELT REVIEW: SITES AND BOUNDARIES STUDY

RELEVANT EXTRACTS FROM SOUTH GLOUCESTERSHIRE LOCAL PLAN CORE STRATEGY, 2006 - 2027

December 2016

6. Managing future development

Introduction

6.1 The core principle in national policy is delivering sustainable development.

6.2 Managing future development is a key priority of the Council's Sustainable Community Strategy and the Council Strategy, so that we deal positively with the challenges posed by more growth, by planning in a sustainable and integrated way for high quality homes, associated employment opportunities, local community facilities and a convenient and safe transport network which meets our communities' needs and aspirations.

6.3 Future development in South Gloucestershire will put further pressure on existing infrastructure, much of which is at or nearing capacity. In order to cope with the additional demand generated by new development and to meet Sustainable Community Strategy objectives, this infrastructure will require improvement and in some cases additional provision. Without new investment, both existing communities and future new neighbourhoods will be neither sustainable nor acceptable. New development will therefore be expected to contribute towards the provision of necessary infrastructure to support the development of sustainable healthy communities and climate change mitigation and adaptation objectives.

6.4 The first policy in this chapter relates to the presumption in favour of sustainable development, as set out in the NPPF, the second policy provides the broad spatial framework for developing in sustainable locations, with the third policy addressing the delivery of infrastructure.

Core Strategy Objectives

- Concentrating the majority of new development to take advantage of existing services and facilities and higher levels of accessibility
- Locating development where it will provide the opportunity to minimise the need to travel and allow safe and convenient access to services by walking, cycling and public transport
- Recognising and protecting the identity and heritage of existing communities
- Promoting greater self-containment and enhancing the service centre role of the market towns of Thornbury, Yate and Chipping Sodbury
- Supporting local housing needs and services in villages
- Protecting the Green Belt and the countryside from inappropriate development
- Providing a range of infrastructure, together with integration and access, in step with new development
- The Council will continually and positively work with communities, developers and infrastructure providers to ensure implementation of the plan is viable and not put at risk throughout the economic cycle as part of pursuing sustainable development

Delivery

6.8 This policy will be delivered through the development management process.

Location of Development

POLICY CS5 – LOCATION OF DEVELOPMENT

In order to deliver the Strategy for Development, the framework for the location and scale of development is:

1. Most new development will take place within the communities of the North and East Fringes of Bristol urban area:

   - the focus will be the development of existing commitments and the remaining South Gloucestershire Local Plan allocations, together with delivery of the Greater Bristol Bus Network, and the planning for the West of England transport package and future schemes; and

   - new neighbourhoods of sustainable communities will be developed at Cribbs/ Patchway and to the east of Harry Stoke.

2. At Yate/Chipping Sodbury, new development will be of a scale appropriate to achieve greater self-containment and to improve the separate but inter-related roles and functions of the towns, focusing on investment in the town centres and improving the range and type of jobs

   - provided infrastructure, particularly sewerage infrastructure, is delivered, a new neighbourhood at north Yate will be developed, supported by a package of transport measures and a new local centre.

3. At Thornbury, new development will be of a scale appropriate to revitalise the town centre and strengthen community services and facilities.

4. The economic potential of Severnside will be realised as a strategic location for a range of employment uses, subject to the resolution of flood risk, environmental and infrastructure issues and taking into account the most recent government legislation and guidance.

5. In the rural areas communities will be empowered to shape the future of their own local area through opportunities presented by Neighbourhood Planning.

Outside the Green Belt (including settlements surrounded by the Green Belt):

(a) small scale development may be permitted within the settlement boundaries of villages defined on the Policies Map

(b) defined settlement boundaries will be maintained around rural settlements and reviewed in the Policies, Sites and Places DPD or a replacement Core Strategy/ Local Plan or Neighbourhood Plan. A review of the approach to the distribution of housing in the rural areas will be undertaken which will include engagement with the local community and other stakeholders/parties

(c) in villages and other settlements without defined settlement boundaries, new development will be strictly controlled, but small scale development within or well related to villages or settlements may come forward through Neighbourhood Planning initiatives and rural housing exception site policy

(d) any changes/proposals should be commensurate with the locality in terms of its form, character and landscape and cumulatively acceptable when considered with any other development identified in the Core Strategy, Policies Sites and Places DPD, replacement Local Plan or Neighbourhood Plans.

(e) In the open countryside, new development will be strictly limited.

6. The extent of the Green Belt will remain unchanged from that shown in the South Gloucestershire Local Plan, except to the east of Harry Stoke/Stoke Gifford (north of the A4174 Avon Ring Road), and to the west of the A4018 at Cribbs Causeway, where the need to: meet future housing requirements; ensure sustainable patterns of development; create and plan comprehensively for sustainable communities; are the exceptional circumstances in which land will be removed from the Green Belt at these locations. In addition, the visual impact of the proposed Stoke Gifford Transport Link on the openness of the Green Belt to the east of Harry Stoke/ Stoke Gifford (north of the A4174 Avon Ring Road) is also considered to provide an exceptional circumstance which justifies the release of this land from the Green Belt.

Elsewhere in the Green Belt:

(a) small scale infill development may be permitted within the settlement boundaries of villages shown on the Policies Map. Settlement boundaries will also be reviewed through the Policies Sites and Places DPD or a replacement Local Plan or a Neighbourhood Plan

(b) development brought forward through a Community Right to Build Order is not inappropriate development in the Green Belt, provided it preserves the openness of the Green Belt and its purposes accord with Government policy

(c) other proposals for development in the Green Belt will need to comply with the provisions in the NPPF or relevant local plan policies in the Core Strategy.

7. The sequential and exceptions tests will be applied to direct development to areas with the lowest probability of flooding, taking account of the vulnerability of the type of development proposed, its contribution to creating sustainable communities and achieving the sustainable objectives of the Core Strategy.

6.9 The largest share of new development will take place within the North Fringe of the Bristol urban area, (incorporating land west of the A4018) which includes the new neighbourhood areas at Cribbs Causeway/Patchway, and on the edge of the North Fringe east of Harry Stoke, and at Emersons Green East in the East Fringe of the Bristol urban area. This represents places where essential infrastructure is in place or planned. This will reduce the need to travel and commute, accompanied by a package of public transport measures and supported by other community infrastructure. The boundaries of the North and East Fringes are shown on the Policies Map.

6.10 Other than in two locations, east of Harry Stoke/Stoke Gifford (north of the A4174 Avon Ring Road) and to the west of the A4018 at Cribbs Causeway, the general extent of the Bristol and Bath Green Belt will be maintained as shown on the Policies Map. The exceptional circumstances identified by the Council, which justify the release of this land from the Green Belt, are the need to:

- meet future housing need
- ensure sustainable patterns of development
- create and plan comprehensively for sustainable communities.

In addition, in relation to the land east of Harry Stoke/Stoke Gifford (north of the A4174 Avon Ring Road), the visual impact of the proposed Stoke Gifford Transport Link on the openness of the Green Belt is also considered to provide an exceptional circumstance which justifies the release of this land from the Green Belt. The Council's Supplementary Planning Document (SPD) "Development in the Green Belt, June 2007" will remain and provide guidance, where it accords with the Green Belt policy in the NPPF, until such time as it is replaced and updated either through a new policy in the Policies, Sites and Places DPD or a replacement Core Strategy/Local Plan.

6.11 Outside the Bristol urban area, development land will be provided in Yate/ Chipping Sodbury and Thornbury, to promote greater self-containment of these settlements. This will include a new neighbourhood to the north of Yate.

6.12 In the rural areas communities will be empowered to shape the future of their own local area through opportunities presented by Neighbourhood Planning. Small scale development will be allowed in villages with defined settlement boundaries where it meets local housing needs or supports or enhances existing services and their viability. However where settlements with defined settlement boundaries are in the Green Belt then, to accord with government guidance, development will be limited to no more than infilling. Affordable housing will be supported in accordance with Policy CS19 (Rural Housing Exception Sites), where there is identified need and local community support. A small element of market housing will be permitted on such sites if it can be satisfactorily proved that this will facilitate the delivery of the local affordable housing need. Settlement boundaries are currently defined on the Policies Map for 37 villages. The defined

Appendix D

WOODLANDS GARDEN VILLAGE, BRISTOL

GREEN BELT REVIEW: SITES AND BOUNDARIES STUDY

RELEVANT EXTRACTS FROM THE WEST OF ENGLAND JOINT SPATIAL PLAN, NOVEMBER 2016.

December 2016

North of M4/M5	Some 13,500 dwellings remain to be constructed on land allocated in the South Gloucestershire Local Plan & Core Strategy across the Bristol North & North East Fringe communities over the next 10-15 years. Further strategic growth in the locality is likely to undermine delivery of these key sites. Moreover Bristol has historically predominantly grown north & eastwards. Strategic growth in the locality would also therefore significantly add to the impression of sprawl significantly undermining the objectives of the Greenbelt. Notwithstanding this, although the locality is in close proximity to existing strategic employment locations the location lacks good connections. Strategic growth would be severed from the existing urban area by the motorway therefore limiting options in terms of new connections. Strategic growth would therefore have a severe impact on Hortham village and J16 being in such close proximity. Strategic growth would also divorce existing communities from access to the countryside and maturing recreational opportunities, important to support existing residential and employment areas in the north Bristol fringe.
Pucklechurch & M4 to Shortwood	Some 13,500 dwellings remain to be constructed on land allocated in the South Gloucestershire Local Plan & Core Strategy across the Bristol North & North East Fringe communities over the next 10-15 years. Further strategic growth in the locality is likely to undermine delivery of these key sites. Moreover similar to significant growth at Kingswood/Warmley, strategic growth will severely exacerbate congestion and air quality issues along radial routes into Bristol, where road space is significantly constrained by the nature of built form so limiting the potential for necessary substantive strategic public transport, walking and cycling interventions. The locality is also less well related to major areas of employment than proposed growth points at Yate & Coalpit Heath. Strategic growth would also further divorce existing communities from physical and visual access to the countryside and potentially impact on Siston Conservation Area. Development between Pucklechurch and the East Fringe is also highly constrained by its topography, ecological and archaeological interests. Significant development in the locality up these escarpments would thus significantly add to the impression of sprawl and separation in the locality undermining the objectives of the Greenbelt. Pucklechurch itself may have potential for some non-strategic growth to support local services.
Olveston	Olveston is surrounded by high quality landscape, ecological and heritage assets. Access is along 'lanes'. This village is not considered suitable for strategic level growth but may have potential for some non-strategic growth to support local services.
Wickwar	Major strategic growth is not considered appropriate due to areas of important landscape, heritage and ecological value to the north, northwest and east. The village is also less well related to major areas of employment than proposed growth points at Yate & Coalpit Heath. Strategic growth would be car based with limited opportunity to improve public transport options, thereby also impacting on other settlements on route to higher order localities and the strategic transport network. However the village may have potential for some non-strategic growth to support local services.
Alveston	Major strategic growth is not considered appropriate due to areas of particular landscape and heritage value to the north, northeast and west. The A38 would sever development to the southeast from the village. Development to the north would also compromise separation from Thornbury undermining green belt objectives. The settlement / locality is therefore not considered suitable for strategic level growth but may have potential for some non-strategic growth to support local services.

Appendix E

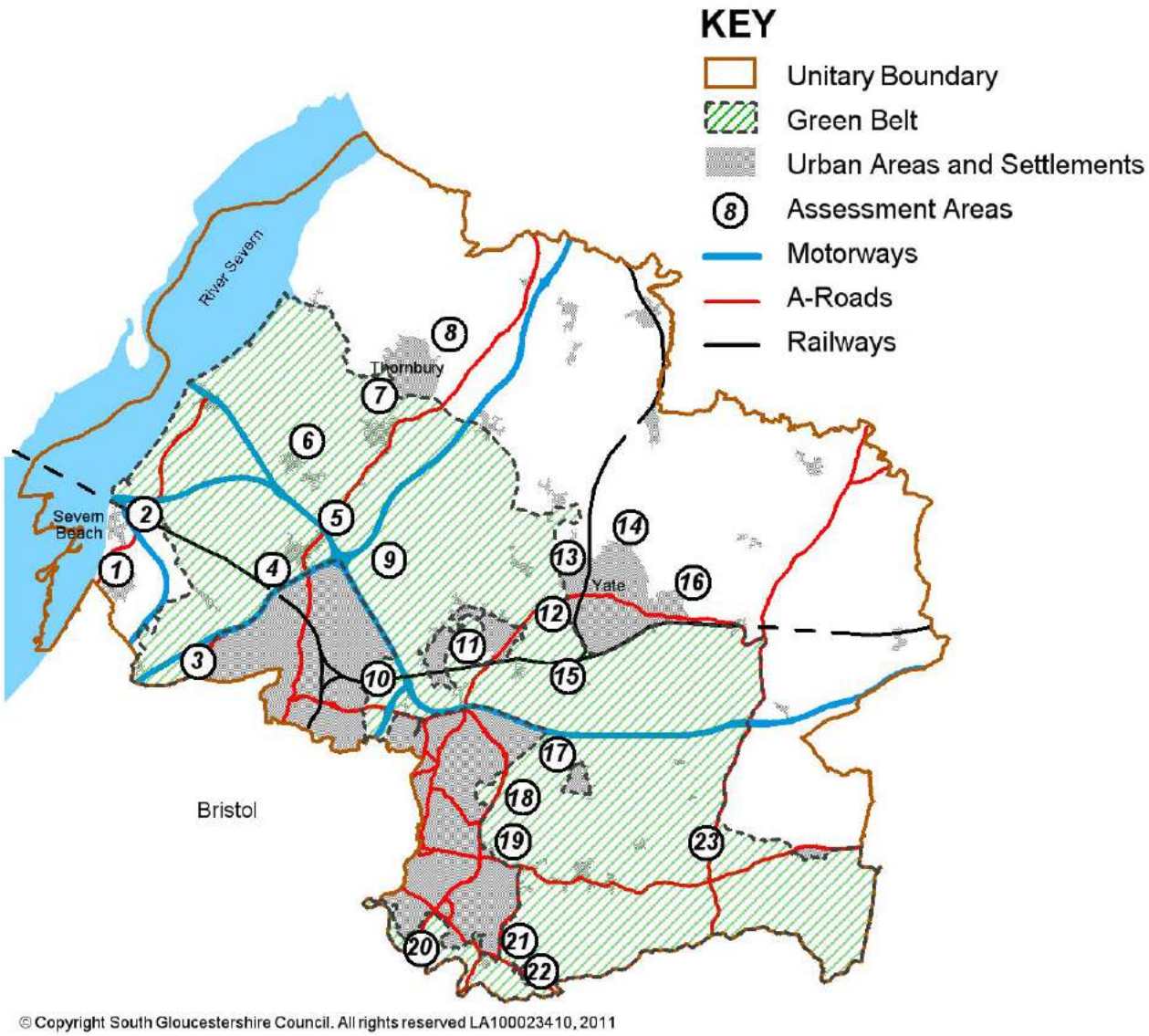
WOODLANDS GARDEN VILLAGE, BRISTOL

GREEN BELT REVIEW: SITES AND BOUNDARIES STUDY

RELEVANT EXTRACTS FROM THE SOUTH GLOUCESTERSHIRE STRATEGIC GREEN BELT ASSESSMENT, 2006

December 2016

Diagram 1: The South Gloucestershire – Strategic Green Belt Assessment: General Indication of the Strategic Assessment Areas



© Copyright South Gloucestershire Council. All rights reserved LA100023410, 2011

2.8 The South Gloucestershire 2006 assessment considered how the existing Green Belt in various locations in South Gloucestershire fulfils the statutory purposes as identified in Government guidance contained in PPG2. The purposes remain unchanged in the draft National Planning Policy framework, the findings are therefore still appropriate. In addition the assessment considered the uses of Green Belt land in these locations in relation to the objectives set out in PPG2.

2.9 South Gloucestershire was divided into 23 areas (see Diagram 1) and site visits were undertaken to record a commentary on how each area fulfilled the Green Belt purposes and objectives. This methodology provided a much finer grain of assessment than the two reports prepared in support of the Regional Strategy (RS), as these grouped larger areas/land cells together for analysis, and in the case of the of 2007 (Arup) report (Document Reference LR13) focused upon the Green Belt areas surrounding the Bristol conurbation.

AREA 9: EARTHCOTT

Green Belt Purpose (As defined by National Planning Policy)	Commentary	Performs Purpose	Number of Purposes fulfilled
1. To check the unrestricted sprawl of large built-up areas	The M4 currently defines the boundary of main built up area of Bristol in this area. Extensive urban area running north from central Bristol. Although physically close to the North Fringe the M4 is a barrier.	✓	**5**
2. To prevent neighbouring towns from merging into one another	This Green Belt land contains Winterbourne to the West.	✓	
3. To assist in safeguarding the countryside from encroachment	The land is still predominantly in agriculture and rural in character away from the M4 and M5 corridors. Not prominent from existing North Fringe urban area but can be viewed from the M4 and from the north including from the M5. The earth bunding around the Motorway junction screens the urban edge from this area. The landform is characterised by north/south running ridge and valley form. There is no strong landscape feature which defines the northern edge of this area. The land is overlooked by the M5 motorway on the west but does not have a strong visual relationship with the northern edge of Bristol. Views occur eastwards towards Yate and Winterbourne.	✓	
4. To preserve the setting of historic towns	Land around Winterbourne church and its visual envelope currently contributes to the setting and character of the church. Some developments south of the M4 currently intrude into views from the church.	✓	
5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land	Restricting development on green field land adjacent to urban area assists in encouraging the re-use of previously developed (brown field) sites within the urban area. The phasing of the release of any Green Belt/green field land for development could ensure that regeneration and recycling is achieved first	✓	
Conclusions	Loss of this area would substantially expand perception of the Bristol urban area from the North. There is no strong landscape feature which defines the northern extent of this area. The M4 currently forms a clear physical boundary to the urban edge in this area. Loss of Green Belt land adjoining or close to Winterbourne would adversely affect the separate identity of the settlement.		

Appendix F

WOODLANDS GARDEN VILLAGE, BRISTOL

GREEN BELT REVIEW: SITES AND BOUNDARIES STUDY

RELEVANT EXTRACTS FROM THE SOUTH GLOUCESTERSHIRE CORE STRATEGY STRATEGIC GREEN BELT ASSESSMENT, DECEMBER 2011.

December 2016

Stage 1 Analysis – Detailed evaluation of the Green Belt in South Gloucestershire

3. Detailed evaluation of the Green Belt in South Gloucestershire

3.1 The 2006 South Gloucestershire Council Strategic Green Belt Assessment has been used to score the South Gloucestershire Green Belt area against the five Green Belt purposes, as defined in national planning policy. The results of the assessment are set out in detail in Appendix 1, and summarised in Table 2 and visually displayed in Diagram 2 below.

Methodology

3.2 The South Gloucestershire Strategic Green Belt Assessment 2006 divided South Gloucestershire into 23 strategic assessment areas, which are shown diagrammatically at Diagram 1. At that time it was decided to only review Green Belt areas that were located in or around or capable of affecting urban areas, as this was in accordance with the Regional Strategy's emphasis on development of a strategic scale being more sustainable when located in urban rather than rural locations. Remote rural areas were discounted at that time. The Council is of the opinion that where options for development have been ruled out by a SEA compliant process these options do not need to be revisited, except if there has been a material change in circumstance which make the previous conclusions no longer applicable. The Council is of the opinion that in relation to focusing development of a strategic scale to urban areas in order to achieve sustainable development, there have are no material changes in circumstances and therefore this position has not been revisited. This position is noted in paragraph 3.7 in order to provide a context for the entire South Gloucestershire Green Belt.

3.3 A site visit was made to each strategic assessment area and an assessment sheet completed for each. The assessment sheets for each of the 23 strategic assessment areas are set out in Appendix 1. These were originally produced in the 2006 assessment with further explanation provided by this 2011 assessment. The assessment sheets were used by the assessors to record a commentary on how each strategic area fulfilled the Green Belt purposes against a prescribed methodology set out below in Table 1:

Table 1:

National Policy: Purposes of Green Belt	**Further explanation of the method of analysis and parameters used**
1. To check the unrestricted sprawl of large built-up areas	In order to consider the Green Belt purpose of whether a strategic assessment area checks the unrestricted sprawl of large built up areas the assessors considered if development would: - take place outside urban areas; - take place in area that cannot be easily linked to existing town centres by public transport; and - impact on the accessibility to the open countryside for urban residents.

2. To prevent neighbouring towns from merging into one another	In order to consider the Green Belt purpose of whether a strategic assessment area prevents neighbouring towns from merging into one another the assessors considered if development would: - lead to Bristol merging with Bath; - lead to Bristol and Bath merging with settlements near to the edge of the conurbation; - lead to Bristol merging with Yate / Chipping Sodbury, and the settlements in between; - lead to Bristol merging with Thornbury and the settlements in between; and - erode the visual separation both from distant views and as perceived when travelling between settlements or from within settlements.
3. To assist in safeguarding the countryside from encroachment	In order to consider the Green Belt purpose of whether a strategic assessment area assists in safeguarding the countryside from encroachment the assessors considered if development would impact on the surrounding rural areas outside of the contained urban area. Assessors also considered that whilst landscape quality was not in itself an issue, the impact development would have on the role of smaller scale ridges and key landscape feature in providing a backcloth to urban areas could be considered as these features are fundamental to the appreciation of the open countryside.
4. To preserve the setting of historic towns	In order to consider the Green Belt purpose of whether a strategic assessment area preserves the setting of historic towns the assessors considered if development would impact on: - Bath - Chipping Sodbury - Thornbury - Conservation Areas - The setting and character of highly valued historic assets
5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land	In order to consider the Green Belt purpose of whether a strategic assessment area assists in urban regeneration, by encouraging the recycling of derelict and other urban land the assessors considered if

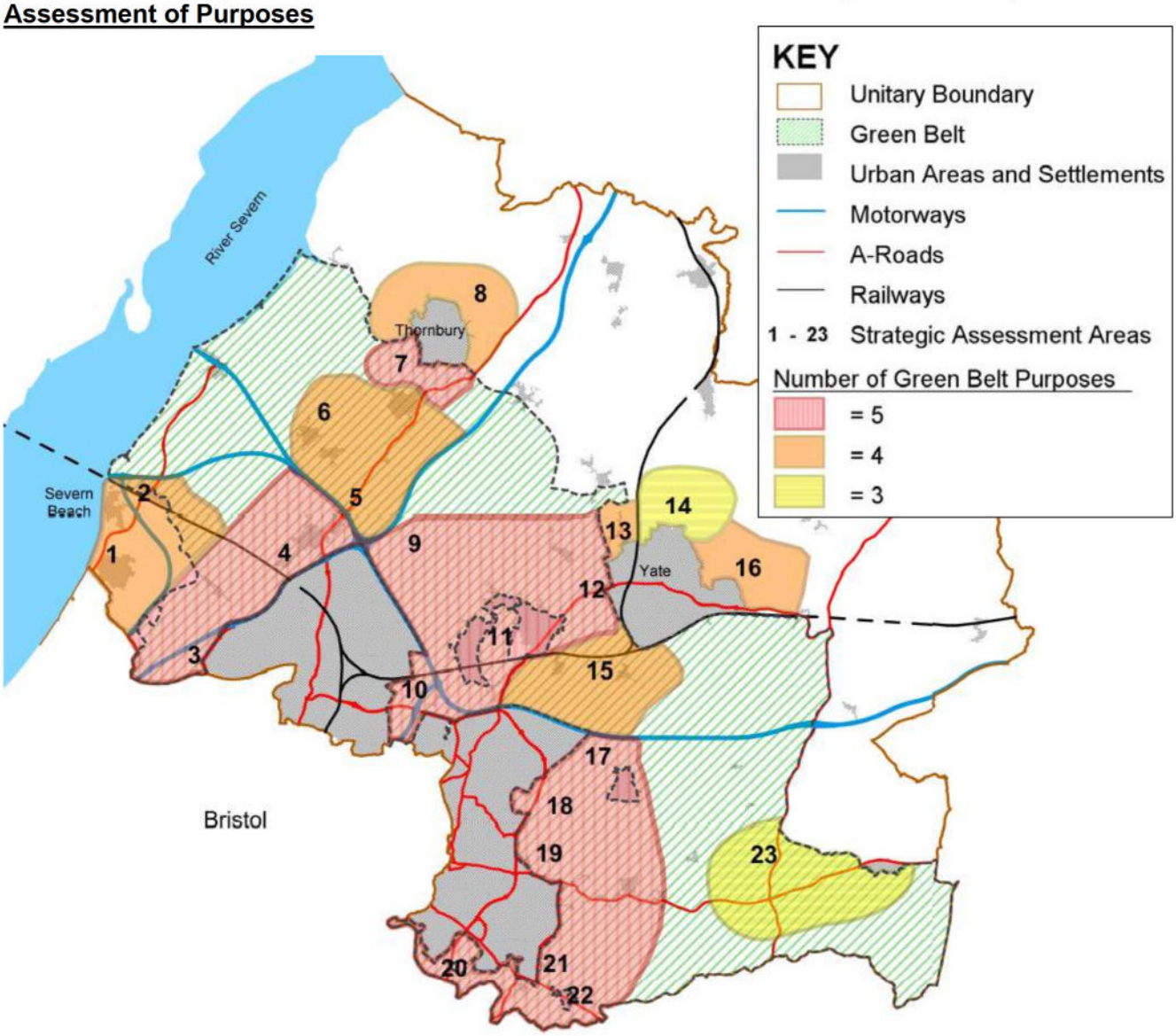
	development would impact upon the likelihood of sites within the existing urban in coming forward. The assessors recognised that this purpose could only be achieved in combination with the appropriate regeneration/development plan policies.

Table 2:
2011 South Gloucestershire Strategic Green Belt Assessment of Purposes – Summary
This table should be read alongside Diagram 2 and paragraphs 3.4 to 3.8.

Strategic Assessment Areas	Description	Purpose					No. of purposes fulfilled
		1. To check the unrestricted sprawl of large built-up areas	2. To prevent neighbouring towns from merging into one another	3. To assist in safeguarding the countryside from encroachment	4. To preserve the setting of historic towns	5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land	
1	Severn Beach*	✓	✓	✓	×	✓	4
2	Pilning**	✓	✓	✓	×	✓	4
3	Cribbs Causeway (between M5 and A4018)	✓	✓	✓	✓	✓	5
4	Almondsbury	✓	✓	✓	✓	✓	5
5	Hortham	✓	✓	✓	×	✓	4
6	Tockington	×	✓	✓	✓	✓	4
7	Thornbury (south and south west)	✓	✓	✓	✓	✓	5
8	Thornbury (north west, north and east)*	✓	×	✓	✓	✓	4
9	Earthcott	✓	✓	✓	✓	✓	5
10	Harry Stoke/Hambrook/M32 Corridor up to M4	✓	✓	✓	✓	✓	5
11	Frampton Cotterell and Winterbourne	✓	✓	✓	✓	✓	5
12	Iron Acton and Nibley	✓	✓	✓	✓	✓	5
13	North of Yate - Engine Common to the railway line*	✓	✓	✓	×	✓	4
14	North of Yate - East of the railway line*	✓	×	✓	×	✓	3
15	Wapley (Ramhill, Westerleigh)	✓	✓	✓	×	✓	4
16	East of Chipping Sodbury*	✓	×	✓	✓	✓	4
17	East of Emersons Green and Pucklechurch	✓	✓	✓	✓	✓	5
18	Shortwood	✓	✓	✓	✓	✓	5
19	Warmley Area (Webbs Heath/Goose Green)	✓	✓	✓	✓	✓	5
20	Hanham	✓	✓	✓	✓	✓	5
21	Oldland Common	✓	✓	✓	✓	✓	5
22	Bitton	✓	✓	✓	✓	✓	5
23	Tog Hill to Marshfield	×	×	✓	✓	✓	3

* Not currently designated as Green Belt
** The north of this area is designated as Green Belt but not the south

Diagram 2:
Diagrammatic Representation of 2011 South Gloucestershire Strategic Green Belt Assessment of Purposes



© Copyright South Gloucestershire Council. All rights reserved LA100023410, 2011

Areas: 3, 4, 7, 9, 10, 11, 12, 17, 18, 19, 20, 21 and 22

These areas perform all of the 5 Green Belt purposes

3.4 These areas perform all of the Green Belt purposes. The areas are primarily located next to the urban edge of the Bristol conurbation. Only the land to the south of Thornbury (Area 7) also performs all of the Green Belt purposes. There are only two areas that adjoin the Bristol conurbation, albeit separated by the motorway, which do not register as performing all the Green Belt purposes. These are the Hortham area (Area 5) and the Wapley (Ramhill, Westerleigh) (Area 15) – the Green Belt in both these locations does not serve the purpose of preserving an historic setting.

- Justification for the Strategy for Housing to 2026, March 2011 Appendix 1: Transport Infrastructure (Document reference EB21);and
- South Gloucestershire Council's Response to Inspector's Questions, 28th June 2011 - Appendix 3: Transport Analysis Bristol East Fringe (Document Reference SG5).

5.4 This strategic analysis for the purpose of this Green Belt assessment does not replace the Core Strategy's Sustainable Appraisal.

5.5 The methodology of how each strategic assessment area has been tested against these broad constraints is set out in Table 3:

Table 3:

Constraints	**Methodology** Consideration was given to the following elements of each of the constraints, interpreted from the high level objectives of the South Gloucestershire Local Development Framework's Sustainability Appraisal framework:
1. Sustainability	a. Urban focus: b. Access to community facilities / services c. Access to employment d. Access to retail
2. Environmental	a. Flood risk b. Landscape c. Biodiversity d. Built environment
3. Infrastructure Availability / Delivery	a. Public transport b. Road network c. Green infrastructure d. Water infrastructure e. Waste infrastructure
4. Green Belt	Established through the Stage 1 analysis.
5. Commentary	Highlights the critical/decisive constraints (i.e. those considerations which prevent or severely restrict the scale or scope for strategic development in that area) which informed the decision reached on whether the area should be considered for residential development.
6. Conclusion	A concluding statement is set out for each strategic assessment area. This identifies whether an area is suitable and necessary for strategic development and whether this matches the conclusion reached by the RS.

5.6 The strategic assessment areas have been grouped together by the spatial characteristics, as follows:

- Rural Areas = Areas 1, 2, 6, 23 and other remoter rural Green Belt areas. As set out in Table 4A.

- North Fringe, outside of the motorway box (areas north, north-west of the M4 and M5) = Areas 4, 5, 9, 11 and 15. As set out in Table 4B.
- East Fringe = Areas 17, 18, 19, 20, 21 and 22. As set out in Table 4C.
- Thornbury = Areas 7 and 8. As set out in Table 4D.
- Surrounding Yate / Chipping Sodbury = Areas 12, 13, 14, and 16 (Area 15 which to the south west of Yate is considered along with North Fringe areas as it adjoins the motorway). As set out in Table 4E.
- North Fringe, inside of the motorway network = Areas 3 and 10. As set out in Table 4F.

Table 4B, covering Strategic Assessment Areas 4, 5, 9, 11 and 15:

Location: North Fringe, outside of the motorway box (areas north and north-west of the M4 and M5)						
Strategic Assessment Area	**Constraints**				**Commentary**	**Conclusion**
	Sustainability	**Environmental**	**Infrastructure Availability / Delivery**	**Green Belt purposes (max=5)**		
4	✓	×	✓	5	Unsustainable location due severance caused by the motorway restricting connectivity with the Bristol conurbation. Limited public transport and limited opportunities for improvement.	Not considered suitable for strategic residential development. This is consistent with the conclusion reached by the RS.
5	✓	×	✓	4	Unsustainable location due severance caused by the motorway restricting connectivity with the Bristol conurbation. Limited public transport and limited opportunities for improvement.	Not considered suitable for strategic residential development. This is consistent with the conclusion reached by the RS.
9	✓	×	✓	5	Unsustainable location due severance caused by the motorway restricting connectivity with the Bristol conurbation. Limited public transport and limited opportunities for improvement.	Not considered suitable for strategic residential development. This is consistent with the conclusion reached by the RS.
11	✓	×	×	5	Unsustainable location due severance caused by the motorway restricting connectivity with the Bristol conurbation.	Not considered suitable for strategic residential development. This is consistent with the conclusion reached by the RS.
15	✓	×	✓	4	Unsustainable location due severance caused by the motorway restricting connectivity with the Bristol conurbation. Limited public transport and limited opportunities for improvement. The railway lines would impede integration with the Yate/Chipping Sodbury urban area.	Not considered suitable for strategic residential development or necessary to meet the housing need. This is consistent with the conclusion reached by the RS.

North Fringe, outside of the motorway box Conclusions:

5.8 The Council and the communities of South Gloucestershire support the RS's view that the growth of Greater Bristol should not "jump" the M4 and M5 motorway corridors, for sustainability reasons. The RS considered the options for development outside the "motorway box" through a Strategic Environmental Assessment (SEA) compliant process. The Council is of the opinion that where options for development have been ruled out by a SEA compliant process these options do not need to be revisited, except if there is a material change in circumstances which make the previous conclusions no longer applicable. The Council is of the opinion that in relation to development outside the "motorway box" there are no material changes in circumstances and therefore these options do not need to be revisited. This is set out at paragraph 3.6b of the South Gloucestershire Council Core Strategy Sustainability Appraisal Report.

Appendix G

WOODLANDS GARDEN VILLAGE, BRISTOL

GREEN BELT REVIEW: SITES AND BOUNDARIES STUDY

WEST OF ENGLAND JOINT SPATIAL PLAN GREEN BELT ASSESSMENT, NOVEMBER 2015.

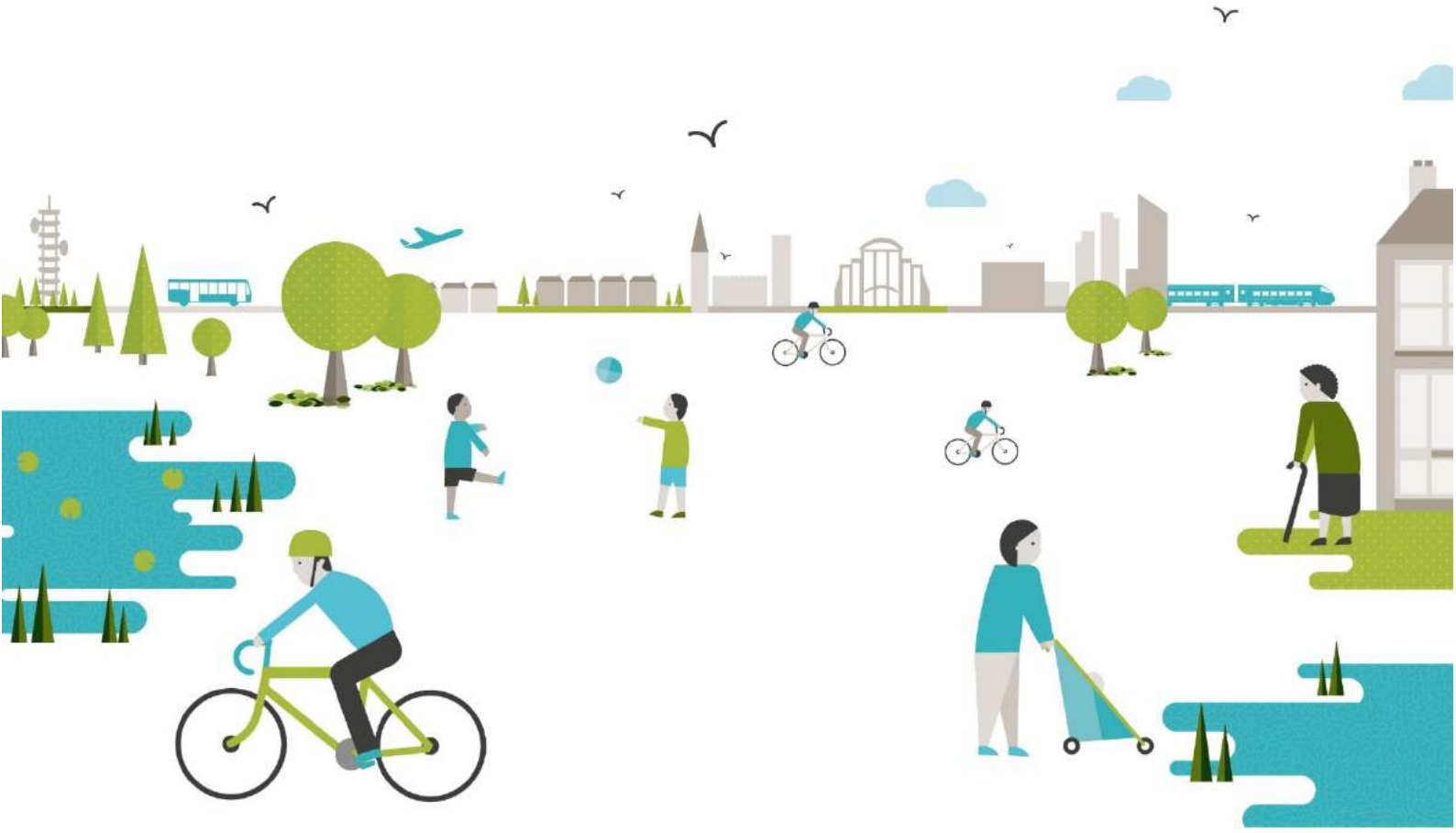
December 2016

WEST OF ENGLAND
BUILDING OUR FUTURE

Joint Spatial Plan

Green Belt Assessment

November 2015



Bath & North East Somerset Council

Bristol City Council

North Somerset Council

South Gloucestershire Council

Joint Spatial Plan Green Belt Assessment

Contents

1. Objective and Purpose 1
2. National Planning Policy 2
3. Bristol and Bath Green Belt – history and current policy 3
4. Method of assessment 7
5. Conclusions and further assessment 9
   Further assessment 10

Appendix 1 – Assessment Matrix 12
Figure 1 – Bristol Bath Green Belt 59
Figure 2 – Cells serving purpose 1 60
Figure 3 – Cells serving purpose 2 61
Figure 4 – Cells serving purpose 3 62
Figure 5 – Cells serving purpose 4 63
Figure 6 – Cells serving purpose 5 64
Appendix 2 – Local Plan policies 65

1. Objective and Purpose

1.1 The objective of this document is to assess the Green Belt across the West of England area, comprising the administrative areas of Bristol, North Somerset, South Gloucestershire and Bath and North East Somerset. It provides a strategic assessment of the whole Green Belt across the plan area in relation to the purposes of Green Belts as set out in the National Planning Policy Framework. For the purposes of this study, the Green Belt has been divided into cells which have been assessed to determine which of the five purposes of Green Belt they serve, having regard to the essential characteristic of openness. The assessment also identifies and describes any changes to the characteristics of locations within the Green Belt.

1.2 This assessment has been undertaken to provide part of the evidence base for the preparation of the West of England Joint Spatial Plan. It will help to inform the consideration of options for formulation the spatial strategy in the Plan.

2. National Planning Policy

2.1 This assessment has been undertaken in the context of national policy set out in the National Planning Policy Framework (NPPF). Whilst the NPPF sets out a presumption in favour of sustainable development this general presumption does not extend to Green Belt (paragraph 14). For plan making, the NPPF explains that Local Plans should meet objectively assessed needs for development unless;

'specific policies in this Framework indicate development should be restricted'.

Footnote 9 to paragraph 14 explains what the specific policies referred to are:

'*For example, those policies relating to sites protected under the Birds and Habitats Directives (see paragraph 119) and/or designated as Sites of Special Scientific Interest;* ***land designated as Green Belt****, Local Green Space, an Area of Outstanding Natural Beauty, Heritage Coast or within a National Park (or the Broads Authority); designated heritage assets; and locations at risk of flooding or coastal erosion.'*

2.2 Paragraph 17 of the NPPF sets out core land use planning principles which should underpin both plan-making and decision-taking. The fifth principle indicates that planning should:

'take account of the different roles and character of different areas, promoting the vitality of our main urban areas, ***protecting the Green Belts around them****, recognising the intrinsic character and beauty of the countryside and supporting thriving rural communities within it'*

2.3 Section 9 of the National Planning Policy Framework (NPPF) explains that the government attaches great importance to Green Belts. The NPPF states:

'The fundamental aim of Green Belt policy is to prevent urban sprawl by keeping land permanently open; the essential characteristics of Green Belts are their openness and their permanence.' (NPPF paragraph 79)

2.4 The NPPF goes on to state that Green Belt serves five purposes. These are:

'to check the unrestricted sprawl of large built-up areas;
to prevent neighbouring towns merging into one another;
to assist in safeguarding the countryside from encroachment;
to preserve the setting and special character of historic towns; and
to assist in urban regeneration, by encouraging the recycling of derelict and other urban land. (NPPF paragraph 80).

2.5 The NPPF explains that the general extent of Green Belts across the country is already established (paragraph 82) and that boundaries are established in Local Plans. Paragraph 83 states:

'Once established, Green Belt boundaries should only be altered in exceptional circumstances, through the preparation or review of the Local Plan. At that time, authorities should consider the Green Belt boundaries having regard to their intended permanence in the long term, so that they should be capable of enduring beyond the plan period.'

3. Bristol and Bath Green Belt – history and current policy

3.1 The Bristol and Bath Green Belt was broadly established in the mid-1950s through the Gloucestershire, Somerset and Wiltshire County Development Plans. The majority of the Bristol and Bath Green Belt fell within the Somerset authority area and the Green Belt designation was locally adopted in 1957 and then given Ministerial approval in 1966.

3.2 The Avon County Structure Plan of 1985 defined the general extent of the Green Belt at that time with the detailed boundaries then defined in Local Plans. These included the South West Avon Green Belt Local Plan which was adopted in 1988.

3.3 The most recent strategic plan to cover the entire plan area was the Joint Structure Plan 2002 which has now been revoked. The Joint Structure Plan defined the continued general extent of the Green Belt and showed it on a key diagram. Policy 16 set out its purpose:

"A Green Belt shall continue to surround and separate Bristol and Bath, and will be kept open in order to:

- *check the unrestricted sprawl of the Bristol conurbation and Bath;*
- *assist in safeguarding the surrounding countryside from encroachment;*
- *prevent neighbouring towns merging into one another;*
- *preserve the setting and special character of villages, towns and historic cities; and*
- *assist in urban regeneration."*

3.4 The aim of the Green Belt in the West of England has been, in the main, to prevent the urban sprawl and merger of Bristol and Bath. It is apparent, however, from the 2002 Joint Structure Plan that emphasis was placed on preserving the setting and special character of the villages and towns within the Green Belt, as well as the overall aim of checking the growth of Bristol and Bath and preventing the merger of the two cities.

The Green Belt today

3.5 The Green Belt covers approximately 74,000 hectares - 48% of the West of England ; see Figure 1.

3.6 Most of the Bristol urban area including the Bristol Port and Avonmouth/Severnside areas is surrounded by the Green Belt. It closely abuts the built-up area. The Green Belt completely surrounds the city of Bath. It also surrounds several other settlements the largest of which is Keynsham.

3.7 The outer edge of the Green Belt extends up to 12.5 km from the edge of the Bristol and Bath urban areas. There are a number of settlements which adjoin but lie outside the Green Belt. These include Clevedon, Nailsea, Yate, Thornbury and Portishead.

3.8 The current extent of the Green Belt in the Joint Spatial Plan area and its detailed boundaries are defined in the adopted local plans of each authority. The relevant Green Belt policies for the plan area are reproduced in Appendix 2 and the details are discussed below:

Bath & North East Somerset

3.8.1 Approximately 35,000 hectares (around 70%) of land in Bath and North East Somerset is designated as Green Belt. The Green Belt boundary within B&NES is defined on the Policies Map as defined in the Adopted B&NES Local Plan and revised in the Core Strategy. The detailed boundary is being reviewed through the Council's Placemaking Plan (at Options stage when this assessment was published).

3.8.2 Bath and North East Somerset Core Strategy Policy CP8 Green Belt indicates the general extent of the Green Belt in Bath and North East Somerset. The explanatory text of the policy summarises purposes of including land in the Green Belt as well as objectives for the use of land. Paragraph 6.62 says that the purposes and objectives generally reflect advice set out in national policy. The purposes which make specific reference to places within Bath and North East Somerset are:

"To check the unrestricted sprawl of Bath and Bristol.
To prevent the merging of Bristol with Keynsham, Saltford and Bath.
To preserve the setting and special character of Bath.
To assist in urban regeneration of Bath and Bristol by encouraging the recycling of derelict and other urban land.
To preserve the individual character, identity and setting of Keynsham and villages and hamlets within the Green Belt."

3.8.3 Four areas of land formerly in the Green Belt were removed from the designation and allocated for development in the adopted Core Strategy:

- Land at Whitchurch
- Land to the south west of Keynsham
- Land to the east of Keynsham (in addition to removing land from the Green Belt for development further land is also safeguarded for possible development in the longer term)
- Land at Odd Down (to the south of Bath)

Bristol

3.8.4 Approximately 600 hectares of land in Bristol City Council area are designated as Green Belt. This land forms parts of the inner edges of the Green Belt which extends from Bristol into South Gloucestershire, Bath and North East Somerset and North Somerset.

3.8.5 The general extent of Green Belt in Bristol is shown on the key diagram of the Bristol Core Strategy adopted June 2011 and the policy approach is set out in Policy BCS6. Detailed boundaries are shown in the Site Allocations and Development Management Policies Local Plan adopted July 2014. There were no changes to the Green Belt boundaries from the previous local plan which adopted in 1997.

3.8.6 The explanatory text of Policy BCS6 notes that within Bristol's boundaries the Green Belt covers a small area to the east beside the M32 with several tracts on the city's south eastern, southern and south western boundaries. All areas are noted as contributing to the purposes of designation. In addition it is noted that in several

locations including Ashton Court, Bedminster Down, the slopes at Dundry, Stockwood and the Avon Valley, Green Belt land also forms very prominent elements of the city's landscape setting. Paragraph 4.6.3 says:

"The Green Belt plays a strategic role in containing the outward expansion of Bristol, providing a green setting for the city and focussing attention upon the regeneration of previously developed land"

3.8.7 A contingency for future development at South East Bristol is referred to in the Bristol Core Strategy (Policy BCS5) and indicated on the Key Diagram. This does not, however, appear as a designation on the Local Plan Policies Map. The approach to the contingency is explained in Policy BCS5 paragraph 4.5.22.

North Somerset

3.8.8 15,490 hectares (40%) of land in North Somerset are designated as Green Belt The current extent of the North Somerset section of Green Belt is defined in the North Somerset Replacement Local Plan 2007. This Plan extended the Green Belt between the Royal Portbury Dock and the new development to the east of Portishead whilst excluding areas at the dock specifically for port related uses. The Replacement Plan also created an inset in the Green Belt at Bristol Airport to accommodate medium term expansion requirements.

3.8.9 The North Somerset Core Strategy was adopted in April 2012 and included a policy for Green Belt. This was one of a group of policies remitted following a High Court Challenge to the adopted Core Strategy. The explanatory text of Policy CS6 North Somerset's Green Belt (paragraph 3.91) identifies the five functions Green Belt performs. Paragraph 3.93 goes on to say:

'The protection and maintenance of the Green Belt is very important to the affected communities, and ensures a clear distinction between urban Bristol and rural North Somerset. It makes an important contribution to their local character and distinctiveness and is highly valued and strongly supported'

South Gloucestershire

3.8.10 23,026 hectares of land in South Gloucestershire are designated as Green Belt.

3.8.11 Protecting the Green Belt from inappropriate development is one of the strategic objectives of the South Gloucestershire Core Strategy (paragraph 6.4). Core Strategy Policy CS5 explains the general extent of the Green Belt which is shown on the Key Diagram and detailed boundaries are designated on the Policies Map. Policy CS5 also explains the general approach to development in the Green Belt.

3.8.12 The Core Strategy sets out a summary strategy for development. Paragraph 1.31 says:

"In promoting this Strategy for Development, the Council has sought to limit the impact of new housing development on the Green Belt. The Council remains in principle opposed to significantly reducing the Green Belt to accommodate land for housing growth per se, where development proposals would be contrary to the Council's adopted development plan"

3.8.13 Two areas formerly in the Green Belt were removed from the designation on adoption of the Core Strategy:

- Land east of Harry Stoke/Stoke Gifford (north of the A4174 Avon Ring Road); and
- Land to the west of the A4018 at Cribbs Causeway.

3.8.14 These changes were brought about through the Core Strategy process and carried out to address exceptional circumstances. Both areas of land became designated as parts of new communities.

Green Belt outside the Joint Spatial Plan area

3.9 The Bristol and Bath Green Belt extends outside the plan area to the east of Bath. In Wiltshire it extends eastwards towards Corsham, Holt and Trowbridge and in Mendip District southeast to Norton St Philip. Figure1 shows the extent of the Green Belt in those areas. Whilst the Bristol & Bath Green Belt extends into Wiltshire and Mendip districts, this assessment has been restricted to the Joint Spatial Plan area.

4. Method of assessment

Definition of the cells

4.1 The Green Belt has been divided into 79 cells for the purposes of this assessment. They provide manageable areas for analysis and presentation of results. Cell definition reflects the need for the assessment to provide greater detail around the inner edges of the Green Belt and adjacent to larger urban areas. In those areas smaller cells have been defined compared to those in areas further from the larger built-up areas.

4.2 Clear physical features have been used wherever possible in identifying assessment cells. These include motorways, roads, railways, rivers or water features, belts of trees and woodland. Consideration has also been given to landscape character and/or topography, including existing land use, plus any boundaries of designated historic/ecological sites (where they have identifiable boundaries). Administrative boundaries have not been used in defining cells.

4.3 Each cell was given a reference number and a name to assist with identification. These are shown in the matrices referred to below.

Assessment of cell against the 5 purposes

4.5 The five purposes of Green Belts set out in the NPPF form the basis for the assessment. These are listed below alongside the form of analysis which was undertaken for each purpose.

Table 1: Application of the five purposes or methodology

National policy: Purposes of Green Belt	**Cell analysis**
1. To check the unrestricted sprawl of large built-up areas	Assessment of whether cell performs the purpose of checking the unrestricted sprawl of the Bristol and Bath built-up areas.
2. To prevent neighbouring towns merging into one another:	Assessment of the cell and whether it prevents neighbouring towns merging into one another. Consideration of whether the cell contributes to purpose 2 by preserving the individual character, identity and setting of villages and hamlets within the Green Belt.
3. To assist in safeguarding the countryside from encroachment	Assessment of the cell and whether it performs the role of assisting in safeguarding the countryside from encroachment. Assessment informed by consideration of existing use and topography.

4. To preserve the setting and special character of historic towns	Assessment of the cell and whether it performs the role of preserving the setting and special character of historic towns. Consideration given to historic areas and their setting and special character with reference to settlements designated as or containing Conservation Areas.
5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land	Assessment of the cell and whether it performs the role of assisting urban regeneration. Noting that this purpose is served by all Green Belt areas, particular note is taken of the relationship of the cell with areas of urban regeneration.

The assessment matrix also includes a description and summary.

Description and summary	An overall description of the features of each cell with particular reference to openness. Identification of any changes in the cell since the Green Belt was most recently designated in the Local Plan. A summary of whether the cell contributes to serving any of the five purposes.

4.6 The assessment process made use of the following sources of information:

- Up-to-date aerial photography – images for each cell were examined systematically to enable the cell to be described and for it to be assessed against the five purposes.
- Data in geographic information systems – these were interrogated to identify mapped features such as AONB or heritage assets.
- Planning application records – were examined to identify planning permissions for development in the Green Belt which may have implications for the cell being assessed.
- Observations from site visits/professional knowledge – these were used to verify information identified from aerial photography.

Results

4.7 The results of the cell assessment are set out in the matrix at Appendix 1. Maps showing the cells which were identified as serving each of the five Green Belt purposes are included – Figures 2 to 6.

5. Conclusions and further assessment

5.1 The cell assessment (Appendix 1) indicates that the Green Belt in the plan area continues to retain the fundamental characteristic of openness and serves the purposes of the Green Belt. The descriptions of each cell identify that the Green Belt in the plan area is mainly open and undeveloped throughout.

Purposes of the Green Belt

5.2 As the cell assessment matrix shows, each cell directly serves two or more of the five purposes defined in the NPPF.

- *Sprawl of large built up areas*

5.3 The cells closest to the large built up areas of Bristol and Bath all directly serve the purpose of checking the unrestricted sprawl of these large built up areas. No areas of significant urban development have been identified in those cells. All cells maintain open, undeveloped land at the edge of these large built-up areas.

- *Prevent neighbouring towns merging*

5.4 Cells between a number of settlements perform the role of preventing neighbouring towns merging into one another. These include the cells in the following corridors:

  - Bristol, Keynsham, Saltford and Bath;
  - Bristol, Winterbourne/Frampton Cotterell/Coalpit Heath, Yate/Chipping Sodbury;
  - Bristol and Thornbury
  - Bristol Port/Bristol urban area and Portishead;
  - Bristol, Long Ashton and Nailsea/Backwell
  - Portishead and Clevedon
  - Bath, *Bradford on Avon and Trowbridge* (*outside the plan area*)

- *Safeguarding countryside from encroachment*

5.5 The description of each cell notes the dominance of countryside and the rural character of the areas. Most cells were identified as serving the purpose of safeguarding the countryside from further encroachment.

- *Preserving the setting and special character of historic towns*

5.6 All the cells surrounding the City of Bath (World Heritage Site) serve the purpose of preserving the setting and special character of historic towns. Cell 70, which provides a prominent open setting to the west of the group of conservation areas of central Bristol and Clifton, was also noted as serving this purpose. In many locations it was noted in the cell

assessment that the Green Belt assisted in preserving the setting of designated Conservation Areas.

- *Assist in urban regeneration*

5.7 The role of the Green Belt in assisting urban regeneration is supported by policies in Local Plans which have regeneration objectives. All cells were identified as assisting in urban regeneration as they collectively encourage the recycling of derelict and other urban land in Bristol (including Avonmouth/Severnside), Bath and the other settlements surrounded by Green Belt. The cells closest to the regeneration areas of south Bristol were specifically identified in the assessment matrix.

Changes to the Green Belt

5.8 The assessment has identified very few areas of significant change to the Green Belt since it was most recently established in Local Plans. The following changes were noted in the assessment of cells:

- The construction of the South Bristol Link has commenced in cells 69, 68 and 59. This will result in the development of a road/rapid transit route in the area connecting the A370 and A38. Whilst the construction of the road will not necessarily reduce the openness of the wider Green Belt in this location, it will result in the introduction of a new feature close to the western edge of the Bristol urban area. Some areas of open land to east of the new route will be physically separated from open areas to the west.
- In cell 48, on land adjacent to the A4 roundabout at Durley Hill, development of a fire station has been granted planning permission and is being implemented.
- In cell 3, on land adjacent to the M4/M5 Almondsbury interchange, planning permission has been granted for a new operations base for emergency helicopters under reference PT15/1438/F(South Gloucestershire Council). At the time of the assessment development had not commenced.

  In cell 69 planning permission was granted under reference 09/02242/P (Bristol City Council) for the development of a football stadium, 253 dwellings and other uses. The permitted stadium would have been used by Bristol City Football Club. However, the club's existing stadium is now being redeveloped on its existing site within the Bristol urban area and so the permitted development is not being progressed; the site remains open and undeveloped.

Further assessment

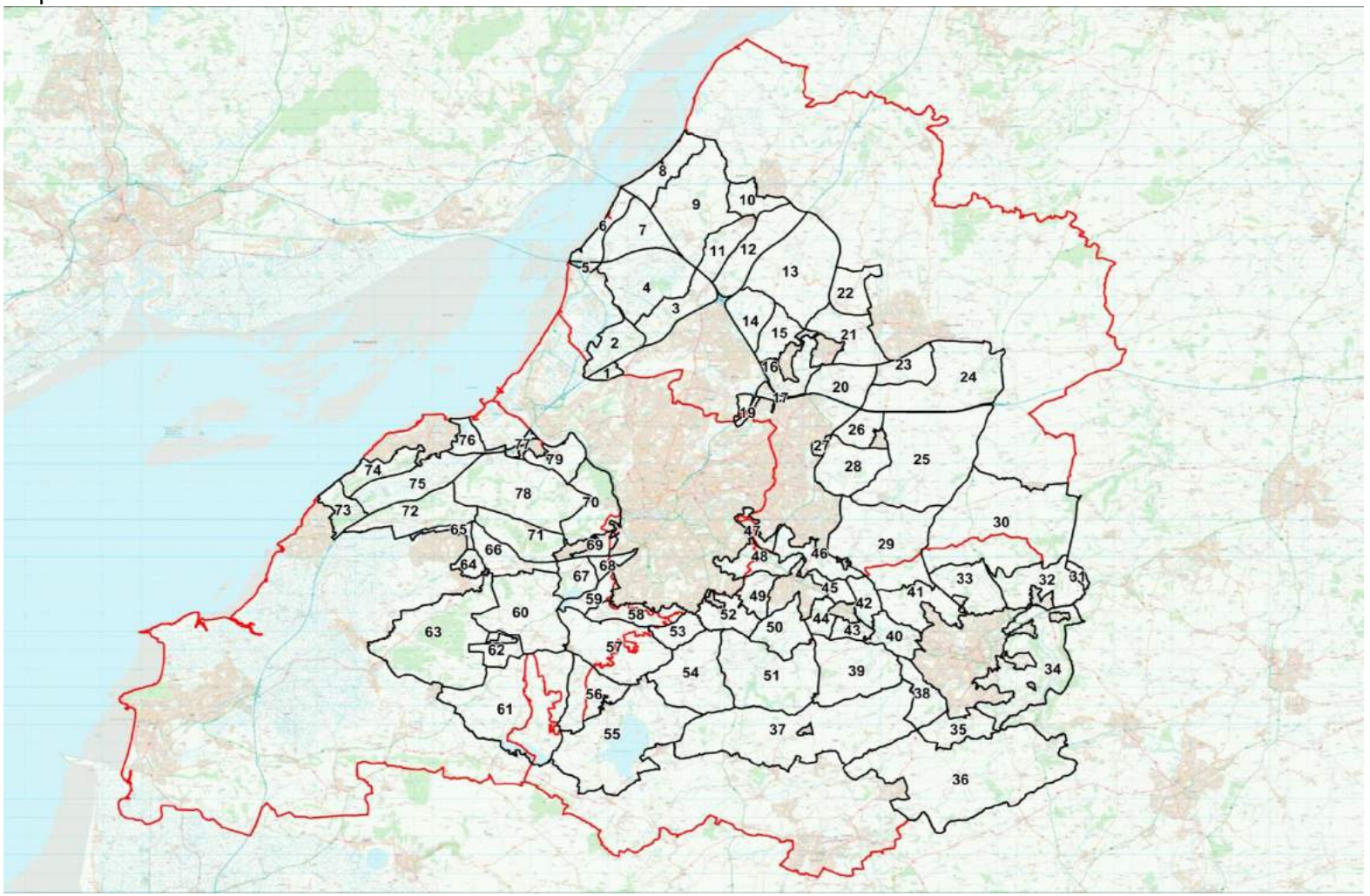
5.9 At this stage the Green Belt Assessment has addressed the matters referred to in the Objective and Purpose section (see section 1 above).

5.10 The Joint Spatial Plan Issues and Options document examines the future needs for homes and employment land in the plan area. It sets out possible strategic locations and spatial scenarios for the location of future development in the West of England area. The NPPF requires that Green Belt boundaries are only changed if there are exceptional circumstances. Subsequent stages of this assessment will consider the impact on the Green

Belt of any proposals which would result in changes to the Green Belt boundaries in the event that exceptional circumstances are demonstrated. The subsequent stages will, therefore, consider the impact of removing any locations from the Green Belt, as well as considering the effect on the integrity of the remaining Green Belt area. In doing so, it will have regard to Government policy in NPPF paragraph 83.

Appendix 1 – Assessment Matrix

Map of cells



Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
1. Cribbs Causeway/ Haw Wood	✓ Prevents urban sprawl of Bristol	- Helps to prevent the merging of the built up area with Avonmouth and Severnside	✓ Safeguards countryside from encroachment	- To the south are historic landscapes of Blaise Castle, Brentry and Kingsweston within the Bristol urban area	✓ Adjoins the Northern Arc area of Bristol which is a regeneration area (Bristol Core Strategy June 2011)	The cell comprises a prominent hill with significant woodland. It forms a largely open and undeveloped area between the Henbury railway and the M5 motorway. The checking effect of the Green Belt land in the cell is visually emphasised by the prominence of the slope. The Green Belt in this cell directly serves purposes 1, 3 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
2. Hallen/ Compton Greenfield	✓ Assists in preventing urban area of Bristol sprawling towards the Severnside area and the estuary.	- Helps to prevent the merging of the built up area at Cribbs Causeway with Avonmouth and Severnside with Also maintains the separation of villages and settlements (Hallen, Compton Greenfield and Easter Compton.	✓ Safeguards countryside from encroachment.	-	✓	The cell is bounded by the M5 which in part forms a boundary between the urban area and the wider countryside. Other than very small settlements of Hallen, Berwick and Easter Compton to the west and north of the prominent ridgeline of Spaniorum Hill, it comprises open, undeveloped land with steeps slopes of woodland. The Green Belt in this cell directly serves purposes 1, 3 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
3. Almondsbury/ Easter Compton East	✓ Prevents urban area of Bristol sprawling towards the Severnside area and the estuary.	- Maintains the separation of villages and settlements by preventing Almondsbury village merging with Bristol.	✓ Safeguards open countryside from encroachment.	- Helps preserve the setting of Almondsbury village which is a Conservation Area.	✓	Apart from the village of Almondsbury and the small settlement of Easter Compton, the cell is open and undeveloped. The M5 forms a physical boundary between the urban area and the countryside. Green Belt land around Almondsbury helps to separate the village from the urban area and retain its character as a distinct settlement. Planning permission (ref:PT15/1438/F) has been granted for the construction of a new operations base for emergency helicopters, comprising hangar, grassed final approach and take off area, car parking, met office weather station and new access road. The site comprises approx. 29ha of agricultural land in the Green Belt, bounded by Woodlands Road and M5/M4 to the east, M5 to the south, by the A38, Almondsbury Sports and Social Club to the west and agricultural fields to the north. At the time of the assessment development had not commenced. The Green Belt in the cell directly serves purposes 1, 3 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
4. Pilning	-	- .	✓ Safeguards agricultural land from encroachment	-	✓	Low lying, open agricultural land between Severnside (industrial area) and Almondsbury village. This cell directly serves purposes 3 and 5.
5. Redwick	-	- Maintains the separation of villages and settlements (Redwick, Pilning and Severn Beach).	✓ Safeguards agricultural land from encroachment.	-	✓	Comprises a small area of open land to the south of the M4 which together with the M49 and railway prevent the merging of Pilning, Severn Beach and Redwick. Western edge of cell abuts Severn Estuary Special Protection Area (SPA). The Green Belt directly serves purposes 3 and 5.
6. North Redwick/ Old Passage	-	-	✓ Safeguards agricultural land from encroachment.	-	✓	Comprises open, undeveloped land beside with Severn Estuary Prominent in views from the Severn crossings. Western edge of cell lies within Severn Estuary Special Protection Area (SPA). The Severn Crossings are listed buildings. The Green Belt in this cell directly serves purposes 3 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
7. Northwick/ Aust	-	-	✓ Safeguards agricultural land from encroachment.	-	✓	Low lying open, undeveloped agricultural land in the plain of the Severn Estuary. The Green Belt in this cell directly serves purposes 3 and 5.
8. Aust north	-	-	✓ Safeguards agricultural land from encroachment.	- Helps to preserve part of the setting of Oldbury and its church	✓	Low lying open, undeveloped agricultural land which. Is prominent in views from the Severn Bridge. Western edge of cell lies within Severn Estuary Special Protected Area (SPA). The Severn Bridge is a listed building. The Green Belt in this cell directly serves purposes 3 and 5.
9. Tockington/ Olveston	-	✓ Separates Thornbury from Bristol. Maintains the separation of villages and settlements (Olveston and Tockington).	✓ Safeguards agricultural land and woodland from encroachment.	-	✓	Comprises open, agricultural which includes the villages of Olveston, Elberton and Littleton-on-Severn. The Green Belt land in this cell assists in defining Thornbury, Olveston and Tockington as separate settlements. The Green Belt in this cell directly serves purposes 2, 3 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
10. South of Thornbury	-	✓ Contributes to preventing Thornbury from merging with the Bristol urban area. Maintains the separation of Thornbury and Alveston.	✓ Safeguards countryside from encroachment.	- Preserves the setting of Thornbury and the Conservation Area	✓	Open agricultural land which adjoins the southern edge of Thornbury. This Green Belt land in this cell is close to the town centre and checks the spread of Thornbury and defines its the setting. The centre of Thornbury including the High Street lies within the Conservation Area, as well as land to the south and west of the High Street which adjoins the Green Belt land in this cell. The Green Belt in this cell directly serves purposes 2, 3 and 5.
11. Alveston	✓ Whilst this land cell is not immediately adjacent to the Bristol urban area it is in close proximity and assists in preventing its northward sprawl .	✓ Contributes to separation of Thornbury from Bristol Maintains the separation of villages and settlements (Alveston and Tockington).	✓ Safeguards agricultural land from encroachment.	-	✓	Largely open, agricultural land which is very prominent in views from the West. Includes scattered development on the A38 and some villages. Green Belt land in this cell defines Thornbury, Tockington and Alveston as separate settlements. The Green Belt in this cell directly serves purposes 1, 2, 3 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
12. Rudgeway/ Hortham	✓ Prevents sprawl of the built-up area in this direction beyond the M4/M5 interchange.	✓ Helps to maintain the visual separation between Almondsbury and Hortham. Maintains the separation of villages and settlements.	✓ Safeguards open agricultural land from encroachment.	-	✓	Mainly open, agricultural land. Some scattered development along the A38 and the small settlement of Hortham. The Green Belt land in this cell directly serves purposes 1, 2, 3 and 5.
13. Earthcott Green / Latteridge	- Southern parts of the cell contributes to checking sprawl together with adjacent cells 14 and 15.	- Maintains the separation of villages and settlements.	✓ Safeguards agricultural land from encroachment.	-	✓	Open, mainly undeveloped land characterised by north/south running ridge and valley form. The Green Belt in this cell directly serves purposes 3 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
14 & 15. Land to north-west of Winterbourne	✓ Checks sprawl of the built-up area.	- Maintains the separation of villages and settlements.	✓ Safeguards open countryside from encroachment.	- Cell 15 – defines edge of Winterbourne, preserves setting for Conservation Area around church.	✓	Primarily open land including a golf course, solar energy park and historic parkland. The M4 separates the cell from the built up area. Extensive urban area running north from central Bristol. The open landform is characterised by north/south running ridge and valley landscape. The Green Belt in this cell directly serves purposes 1, 3 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
16. Frampton Cotterell and Winterbourne	✓ Checks sprawl of the built-up area. Open land to south separates Winterbourne from Bristol.	✓ Maintains the separation of villages and settlements. Prevents the separate villages of Winterbourne, Coalpit Heath and Frampton Cotterell and Yate merging with Bristol.	✓ Safeguards agricultural land from encroachment.	- Assists in preserving the setting historic character of Moorend.	✓	The cell comprises open, agricultural land with woodland and hedgerows. There are some widespread areas of residential development and a small primary school. Parts of the M4 separate the cell from the Bristol urban area. Open land of the Green Belt contributes to the separate characters of Whites Hill, Moorend and Hambrook village. The Green Belt land in the cell prevents coalescence of Bristol and the separate villages of Frampton Cotterell, Winterbourne and Coalpit Heath including, with cell 21 and coalescence with Yate. The Green Belt in this cell directly serves purposes 1, 2, 3 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
17, 18 & 19. Harry Stoke/ Hambrook/ Frenchay (M32 corridor up to M4)	✓ Prevents sprawl of the built-up area.	✓ Cumulatively, cells 16, 17 & 18 prevent the merger of the built-uo area with the separate villages of Winterbourne, Coalpit Heath and Frampton Cotterell. Maintains separate identity of Hambrook. with Yate.	✓ Safeguards agricultural land from encroachment.	- Provides a green setting to the built-up area which has a relationship to preserving the setting of Stoke Park historic estate and Hambrook and Frenchay Conservation Areas.	✓	The cells contain open land in a variety of uses including agriculture, horticulture and allotments. Cell 17 prevents development from spreading eastwards. Cells 18 and 19 form a wedge of Green Belt preventing the coalescence of the Harry Stoke and Frenchay areas of the urban area. This area provides a green entrance to the city from the north particularly in views from the M32 which reduces the apparent sprawl of the urban area. The Green Belt in these cells directly serves purposes 1, 2, 3 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
20. Ramhill/ Henfield	✓ Prevents the sprawl of the Bristol built-up area beyond the M4.	✓ Separates Coalpit Heath from the large built-up area. Prevents the merging of Coalpit Heath, Westerleigh and Yate with the Bristol urban area. Maintains the separation of villages and settlements.	✓ Safeguards open land from encroachment.	-	✓	Mixed land uses, predominantly open in character. The Green Belt land here, together with cells 21 and 23 prevent coalescence of Coalpit Heath, Westerleigh and Yate. This area, along with cell 21 currently preserves a narrow open gap between the Bristol urban area, Frampton Cotterell/ Coalpit Heath and Yate. The Green Belt directly serves purposes 1, 2, 3 and 5.
21. North of Frampton Cotterell/ East of Coalpit Heath	-	✓ Prevents Yate merging with the separate villages of Frampton Cotterell, Coalpit Heath and into the Bristol urban area.	✓ Safeguards agricultural land from encroachment.	-	✓	Mainly open, agricultural land with some scattered developed sites. This area currently preserves separation between the Bristol urban area, Frampton Cotterell, Coalpit Heath and Yate and serves to prevent coalescence between these settlements. The Green Belt directly serves purposes 2, 3 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
22. Iron Acton	-	- Maintains the separation of villages and settlements (Prevents Yate merging with Iron Acton. Eastern part of cell separates Engine Common from Rangeworthy).	✓ Safeguards agricultural land from encroachment.	- Helps to preserve setting of Iron Acton Conservation Area, including Algars Manor and Acton Court (LB's)	✓	Cell comprises open agricultural land and includes the village of Iron Acton. Green Belt land here defines the north western edge of Yate. The Green Belt directly serves purposes 3 and 5.
23. Westerleigh/ Wapley	- Checks unrestricted sprawl from south of Yate.	✓ Separates Coalpit Heath from Bristol. Prevents the merging of Coalpit Heath, Westerleigh and Yate. Maintains the separation of villages and settlements.	✓ Safeguards agricultural land from encroachment.	-	✓	Primarily open, agricultural land. The Green Belt land here, together with cells 21 and 20 prevent the merging of Coalpit Heath, Westerleigh and Yate. The Green Belt in this cell directly serves purposes 2, 3 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
24. South of Westerleigh across to Codrington and Dodington	- South West corner checks unrestricted sprawl.	-	✓ Safeguards agricultural land from encroachment.	-	✓	The cell comprises open, undeveloped countryside. Mainly agricultural uses with golf course and historic parkland. Preserves the setting of Dodington Park, historic parkland. The eastern part of the cell is in the Cotswolds AONB. The Green Belt in this cell directly serves purposes 3, and 5.
25. Wick/ Doynton/ Dyrham	-	- Maintains the separation of villages and settlements. (Provides a visual break between Wick and Oldland)	✓ Safeguards agricultural land from encroachment.	- Dyrham Park, historic landscape for which open land forms a setting. Preserves distinct identity of Doynton, Dyrham, Abson and Wick.	✓	The cell comprises open agricultural land and includes Dyrham Park historic landscape and the village of Wick. The eastern part of the cell is in the Cotswolds AONB. The Green Belt directly serves purposes 3 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
26. East of Emersons Green and Pucklechurch	✓ Checks the sprawl of the urban area.	- Maintains the separation of villages and settlements. (Open Green Belt land between Emersons Green East and Pucklechurch prevents the coalescence of the village with the urban area)	✓ Safeguards agricultural land and woodland from encroachment.	- Provides a setting for Conservation Area in Pucklechurch village core, scheduled ancient monuments also.	✓	Mainly open, agricultural land with some woodland and a landfill site. The Green Belt in this cell directly serves purposes 1, 3 and 5.
27. West of ring road/ south east Mangotsfield	✓ Prevents sprawl of the urban area.	-	-	-	✓	Land mainly comprises sports fields and a school, with some open, undeveloped land. There is a landscaped mound adjacent to the A4174. The Green Belt in this cell directly serves purposes 1 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
28. Shortwood / Siston/ Webbs Heath area	✓ Prevents urban sprawl of Bristol.	- Helps to define and separate Warmley and Kingswood from Siston village and Pucklechurch Maintains the separation of villages and settlements.	✓ Safeguards countryside from encroachment.	- Assists in preserving the setting of Siston Conservation Area.	✓	Mainly open, agricultural land with a golf course and areas of woodland. This cell contains Siston Court (listed building) and its grounds. The Green Belt in this cell directly serves purposes 1, 3 and 5.
29. Oldland Common/ north of Bitton	✓ Prevents sprawl of the built-up area. The edge of the urban areas of Bristol at Warmley and Oldland Common is defined by the Green Belt boundary which largely follows the A4175.	✓ Contributes to the separation of the Bristol and Bath urban areas.Provides separation between Wick and Oldland. Helps to define Bitton and Upton Cheyney as distinct settlements.	✓ Safeguards countryside from encroachment.	- Assists in preserving the setting of Upton Cheyney and Beach Conservation Areas. .	✓	Mainly open, agricultural land, with areas of woodland especially in the steep, narrow valleys. The Green Belt in this cell directly serves purposes 1. 2, 3 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
30. Cold Ashton/ Marshfield	-	- Maintains the separation of villages and settlements.	✓ Safeguards open agricultural land from encroachment.	- Eastern area forms the setting to Marshfield Conservation Area.	✓	Open land in agricultural use including arable with areas of woodland especially in the steep, narrow valleys. Designated as Cotswolds AONB. The Green Belt directly serves purposes 3 and 5.
31 & 32. North East of Bath	✓ Checks sprawl of Bath	✓ Prevents the merger of Bath and Corsham in Wiltshire and maintains the separation of villages and settlements (Bathford, Claverton & Monkton Combe).	✓ Safeguards mainly open land from encroachment	✓ Preserves the setting of Bath (as a historic town and a World Heritage Site)	✓ Proximity to Bath	These land cells surround the village of Batheaston, and are primarily open and agricultural in use with very limited development. Their topography varies between the plateau in the north and undulating land to the south characterised by small river valleys. Cell are adjacent to the Green Belt in neighbouring Wiltshire. Designated as Cotswolds AONB. These cells directly serve four Green Belt purposes.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
33. North of Bath	✓ Checks sprawl of Bath	- Maintains the separation of villages and settlements (Charlcombe, Upper Swainswick and Woolley).	✓ Safeguards mainly open land from encroachment	✓ Preserves the setting of Bath (as a historic town and a World Heritage Site)	✓ Proximity to Bath	This land cell bounds the Lansdown and Fairfield Park areas of Bath and incorporates the small rural settlements of Charlcombe, Upper Swainswick and Woolley. Topographically is characterised by a plateau on the edge of the city before sloping down to the east and north into valleys formed by the Lam Brook and its tributaries. Much of the land cell is open but it does include Bath Racecourse. All of the land in this cell is designated as Cotswolds AONB and a small part of the cell lies within the Bath World Heritage Site. The Green Belt in this cell serves four purposes.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
34. East of Bath	✓ Checks sprawl of Bath	✓ Contributes to preventing the merger of Bath, Bradford-on-Avon and Trowbridge. Also maintains the separation of villages and settlements (Bathford, Claverton and Monkton Combe).	✓ Safeguards mainly open land from encroachment	✓ Preserves the setting of Bath (as a historic town and a World Heritage Site). Also preserves the setting of Bathford, Claverton and Monkton Combe Conservation Areas.	✓ Proximity to Bath	This cell largely occupies a plateau to the south east of Bath but slopes descend towards Bath & Bathampton and relatively steep inclines down to the Avon/Midford Brook in the eastern/southern part of the cell. Land is primarily open, although the cell does include the villages and Claverton and Monkton Combe (both washed over by the Green Belt) and surrounds the village of Bathford (excluded from the Green Belt). Cell is adjacent to Green Belt in neighbouring Wiltshire. All of the land in this cell is also designated as Cotswolds AONB and part of the cell lies within the Bath World Heritage Site. The Green Belt in this cell directly serves all five purposes.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
35. South of Bath	✓ Checks sprawl of Bath	- Helps to maintain the separation of Bath and Peasedown St. John & Radstock to the south of the Green Belt, as well as the separation of villages and settlements within the Green Belt (South Stoke and Combe Hay).	✓ Safeguards mainly open land from encroachment	✓ Preserves setting of Bath (as a historic town and a World Heritage Site). Also preserves the setting of South Stoke and Combe hay Conservation Areas.	✓ Proximity to Bath	This land cell is situated to the south of Bath and encompasses open countryside abutting the edge of the city and surrounding the rural settlements of South Stoke and Combe Hay (which are washed over by the Green Belt). It is characterised by plateau land before sloping southwards towards its southern boundary defined by valley of the Cam Brook. Land immediately adjoining the northern edge of this cell has recently been removed from the Green Belt and allocated for development at Odd Down in the B&NES Core Strategy (Adopted 2014). Most of the cell is designated as Cotswold AONB. The Green Belt in this cell directly serves purposes 1, 3, 4 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
36. South East Outer B&NES	- Northern part helps to check sprawl of Bath	- Helps to maintain the separation of Bath and Peasedown St. John & Radstock to the south of the Green Belt, as well as the separation of villages and settlements within the Green Belt (Freshford, Hinton Charterhouse, Wellow & Peasedown).	✓ Safeguards mainly open land from encroachment	✓ Northern part of cell preserves the setting of Bath (as a historic town and a World Heritage Site). It also preserves the setting of Wellow, Hinton Charterhouse & Freshford Conservation Area.	✓	This land cell incorporates the villages of Freshford, Hinton Charterhouse and Wellow. Outside these villages it is largely open farmland. Topographically it is undulating/rolling in character, with some steep hills forming the valleys of the Cam Brook, Wellow Brook and River Avon. Approximately half of the cell to the north west of Wellow is also designated as Cotswolds AONB. Land in this cell directly serves three of the purposes.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
37. South outer B&NES	- North eastern part helps to check sprawl of Bath	- Maintains the separation of villages and settlements (Priston, Farmborough & Timsbury).	✓ Safeguards mainly open land from encroachment	✓ North eastern part of cell preserves the setting of Bath (as a historic town and a World Heritage Site). It also preserves the setting of Farmborough & Priston Conservation Area.	✓	This land cell primarily comprises open rolling countryside. It incorporates villages and hamlets including Priston; and surrounds Farmborough (excluded from the Green Belt) and bounds larger villages of Timsbury and Clutton which lie immediately to the south. Land in this cell directly serves three of the Green Belt purposes.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
38. South West of Bath	✓ Checks sprawl of Bath	✓ Helps to prevent the merger of Bath & Keynsham (and maintain separation of Bath & Saltford). Also maintains the separation of villages and settlements (Englishcombe).	✓ Safeguards mainly open land from encroachment	✓ Preserves the setting of Bath (as a historic town and a World Heritage Site). It also preserves the setting of Englishcombe Conservation Area.	✓ Proximity to Bath	This land cell bounds the south western edge of Bath and is primarily open and in agricultural use, other than the rural settlement of Englishcombe. It has an undulating topography and is comprised of a series valleys (some steep sided) associated with the Newton brook and its tributaries. Land in the northern part of the cell falls within the fundamental Green Belt corridor between Bath, Keynsham and Bristol. Part of this cell lies within the Bath World Heritage Site. The Green Belt in this cell directly serves all five purposes.
39. B&NES Central East	- Eastern part helps to check sprawl of Bath	- Maintains the separation of villages and settlements (Marksbury).	✓ Safeguards mainly open land from encroachment	✓ Eastern part of cell protects setting of Bath (as a historic town and a World Heritage Site)	✓	Land in this cell is primarily open, undulating countryside. It is characterised by woodland (Sites of Nature Conservation Importance). The cell also incorporates the village of Marksbury. The Green Belt in this cell directly serves purposes 3 and 5 and the eastern part serves purpose 4.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
40. West of Bath	✓ Checks sprawl of Bath	✓ Prevents the merger of Bath & Bristol urban area and Bath & Keynsham. Also maintains the separation of villages and settlements (Newton St Loe and Corston).	✓ Safeguards mainly open land from encroachment	✓ Preserves the setting of Bath (as a historic town and a World Heritage Site). It also preserves the setting of Newton St Loe and Corston Conservation Area.	✓ Proximity to Bath	Located to the west of Bath this land cell bounds the Newbridge and Twerton parts of the city. It is primarily open and in agricultural use, other than the rural settlements of Newton St Loe and Corston that are 'washed over' by the Green Belt. It is characterised by a valley floor landscape (associated with River Avon) with slopes rising steeply to the north and south. A small part of this cell (north western area) is designated as AONB and some of the land in the eastern part of the cell lies within the Bath World Heritage Site. The Green Belt in this cell directly serves all 5 purposes.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
41. North West of Bath	✓ Checks sprawl of Bath	✓ Prevents the merger of Bath & Bristol urban area and Bath & Keynsham. Also maintains the separation of villages and settlements (Kelston and North Stoke).	✓ Safeguards mainly open land from encroachment	✓ Preserves the setting of Bath (as a historic town and a World Heritage Site)	✓ Proximity to Bath	Located to the north west of Bath this land cell encompasses the urban areas of Weston and Upper Weston and bounds the Lansdown part of the city. It also includes the rural settlements of Kelston and North Stoke that are 'washed over' by the Green Belt. The cell is also and is characterised by it open landscape and a series of prominent hills and slopes. Designated as part of the Cotswolds AONB. Part of the cell lies within the Bath World Heritage Site. The Green Belt in this cell directly serves all five purposes.
42. North and East of Saltford	-	✓ Prevents the merger of Keynsham & Bath. Also maintains the separation of villages and settlements (Saltford).	✓ Safeguards mainly open land from encroachment	- Preserves the setting of Saltford Conservation Area	✓	Located to the north and east of Saltford land within this cell is mainly in agricultural use and is open and flat. Land in the southern part of this cell lies directly in the corridor between Bristol, Keynsham, Saltford and Bath. The cell directly serves three Green Belt purposes.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
43. South of Saltford	-	✓ Prevents the merger of Keynsham & Bath. Also maintains the separation of villages and settlements (Saltford).	✓ Safeguards mainly open land from encroachment	- Preserves the setting of Saltford Conservation Area	✓	The land cell is located to the south of Saltford with north eastern boundary formed by River Avon. It is mainly open and flat in nature. Other than agricultural uses the cell incorporates Saltford golf course and Folly Wood Site of Nature Conservation Importance. Directly serves three of the five purposes.
44. East of Keynsham	-	✓ Prevents the merger of Keynsham & Bath. Also maintains the separation of villages and settlements (Saltford).	✓ Safeguards mainly open land from encroachment	-	✓	The cell lies between and is contiguous to Keynsham and Saltford. It is mainly open agricultural land. The cell includes Manor Road Woodland which is used for informal recreational purposes.. Land immediately adjoining the north western edge of this cell has recently been removed from the Green Belt and allocated for development at East Keynsham in the B&NES Core Strategy (Adopted 2014). This land cell lies in a Green Belt corridor between Bristol, Keynsham, Saltford and Bath. The land directly serves Green belt purposes 2, 3 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
45. North East of Keynsham/North of Saltford	- Northern part helps check sprawl of Bristol urban area (Oldland/ Willsbridge)	✓ Prevents the merger of Keynsham & Bath. Also maintains the separation of villages and settlements (Saltford).	✓ Safeguards mainly open land from encroachment	-	✓	Land in this cell lies between Keynsham and Saltford and wraps around the northern edges of both settlements. It is mainly open and flat, forming part of the River Avon floodplain. Part of the cell is used for recreational purposes as it is occupied by Avon Valley Country Pak. The cell directly serves four Green Belt purposes.
46. Longwell Green/ south of Bitton	√ Prevents urban sprawl of Bristol	√ Prevents merger of Bristol and Keynsham and contributes to preventing merger of Bristol and Bath.	√	- Assists in preserving setting of Bitton and Upton Cheyney conservation areas.	√	Cell contains Hanham Hill which is a prominent and open landscape feature adjacent to Longwell Green. The Green Belt in this cell directly serves purposes 1, 2, 3 and 5.
47. Hanham	√ Prevents urban sprawl of Bristol.	√ Prevents merger between Bristol and Keynsham.	√	- Preserves the setting of Hanham Abbotts Conservation Area.	√	Cell comprises steeply sloping woodland beside the River Avon and open recreational land at Conham River Park. Includes agricultural land and horse keeping. The Green Belt directly serves purposes 1, 2, 3 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
48. Hicks Gate/northern Keynsham	✓ Prevents sprawl of Bristol either side of A4	✓ Prevents merger of Bristol & Keynsham.	✓ Safeguards mainly open land from encroachment	- North western part of cell protects setting of Keynsham Conservation Area	✓ Proximity to South Bristol regeneration area	This cell forms a narrow gap of between 1.3 to 2 km between Bristol and Keynsham and to the north of Keynsham a gap of under 1 km to Bristol urban area (Longwell Green) to the north. Cell primarily comprises open land in agricultural/horticultural uses and outdoor recreation uses (particularly to the north of Keynsham). On the edge of Bristol (Brislington) there is a small industrial area, institutions in large grounds and scattered dwellings. Development of a Fire Station at Durley Hill has been granted planning permission and is being implemented. The western part of the cell forms an undeveloped wedge of land between the Brislington and Stockwood areas of Bristol. The cell directly serves Green Belt purposes 1, 2, 3 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
49. West of Stockwood	✓ Checks sprawl of Bristol	✓ Prevents merger of Bristol & Keynsham Also maintains the separation of village (Queen Charlton)	✓ Safeguards mainly open land from encroachment	- Preserves the setting of Queen Charlton Conservation Area	✓ Proximity to S. Bristol regeneration area	This cell to the west of Stockwood forms a narrow gap of around 1.3km between Bristol (Stockwood) and Keynsham. It contains a limited loose cluster of development around Old Bristol Road/Stockwood Hill, but is principally open and rural in character. Topographically the cell mainly comprises the valleys of two streams that merge towards the northern part of the cell. The cell directly serves four of the five purposes of the Green Belt.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
50. South of Keynsham	-	-	✓ Safeguards mainly open land from encroachment	- Northern part of cell directly preserves the setting of Keynsham Conservation Area	✓	This cell comprises mainly open land to the south of Keynsham. The land is flat in the western part of the cell, with the Chew Valley in the eastern element. It also includes the hamlet of Chewton Keynsham. Land immediately adjoining the north western edge of this cell has recently been removed from the Green Belt and allocated for development at South West Keynsham in the B&NES Core Strategy (Adopted 2014). Land in this cell lies within a Green Belt corridor separating Bristol, Keynsham and Bath. It directly serves Green Belt purposes 3, 4 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
51. Central B&NES	- Small area in north western part of cell helps to check sprawl of Bristol	- Maintains the separation of villages and settlements (Pensford, Publow and Woolland).	✓ Safeguards mainly open land from encroachment	-	✓	This cell is open undulating countryside in character and includes some steep slopes associated with valleys of the River Chew and its tributaries. It also includes some significant areas of woodland, as well as incorporating several villages and hamlets including Pensford, Publow and Woolland. The Green Belt directly serves purposes 3 and 5 in this cell.
52. Whitchurch	✓ Checks sprawl of Bristol.	- Maintains the separation of villages and settlements Maintains the separation of Bristol and Whitchurch village and maintains the separate identity of Queen Charlton.	✓ Safeguards mainly open land from encroachment	- Preserves the setting of Queen Charlton Conservation Area	✓ Proximity to S. Bristol regeneration area	Land in this cell surrounds the village of Whitchurch and extends eastwards to and bounds Queen Charlton. Other than the village of Whitchurch and loose knit development on the edge of the village the cell comprises gently undulating land which is primarily in open agricultural use. Land immediately adjoining the western edge of this cell has recently been removed from the Green Belt and allocated for development at Whitchurch in the B&NES Core Strategy (Adopted 2014). This land cell directly serves three of the purposes.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
53. West of Dundry	✓ Checks sprawl of Bristol	-	✓ Safeguards mainly open land from encroachment	-	✓ Proximity to S. Bristol regeneration area	The land in this cell is open and primarily undulating in character and used for agriculture. It also incorporates hills (associated with the eastern end of the Dundry Ridge) including the ancient hill fort of Maes Knoll which is a Scheduled Ancient Monument. Land in this cell directly serves Green Belt purposes 1, 3 and 5.
54. B&NES Central West	- Small area in northern part of cell helps to check sprawl of Bristol	- Maintains the separation of villages and settlements (Stanton Drew, Stanton Wick and Norton Malreward).	✓ Safeguards mainly open land from encroachment	-	✓	This land cell incorporates several villages and hamlets, including Stanton Drew, Stanton Wick and Norton Malreward. Outside these settlements land is largely undeveloped and comprises open undulating farmland. The Green Belt here directly serves purposes 3 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	2 To prevent neighbouring towns merging into one another	3. To assist in safeguarding the countryside from encroachment	4. To preserve the setting and special character of historic towns	5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land	
55. Chew Valley Lake	-	- Maintains the separation of villages and settlements (Chew Magna, Chew Stoke, Bishop Sutton, West Harptree, Compton Martin and Ubley).	✓ Safeguards mainly open land from encroachment	-	✓	This cell is primarily open but also incorporates the villages of Chew Magna and Chew Stoke. It is dominated by Chew Valley Lake reservoir which is used for fishing, sailing and informal recreation. The Green Belt here bounds villages immediately to the south of Bishop Sutton, West Harptree, Compton Martin and Ubley. Chew Valley Lake is designated as a Special Protection Area. The southern part of the cell is also covered by the Mendip Hills AONB designation. The Green Belt in this cell directly serves purposes 3 and 5.
56. Northwest of Chew Stoke	-	- Maintains the separation of villages and settlements (Winford, Chew Stoke, Chew Magna)	✓ Safeguards mainly open agricultural land from encroachment	- Preserves the setting and character of Chew Stoke Conservation Area	✓	This land to the northwest of Chew Stoke consists mainly of undulating open farmland. The Green Belt in this cell directly serves purposes 3 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
57. Land to north and east of Windford, south of Dundry and north of Chew Magna	- Northern section helps to check the sprawl of Bristol	- Maintains the separation of villages and settlements (Dundry, Winford and Chew Magna)	✓ Safeguards mainly open agricultural land from encroachment.	- Preserves the setting and character of Chew Magna Conservation Area	✓ Adjacent to the south Bristol regeneration area	This land to the south of Dundry, east of Windford and to the north of Chew Magna consists mainly of rural undulating farmland with occasional woodland and belts of trees. Parts are steeply sloping particularly as the land rises to the Dundry ridge. The high ground and topography particularly to the north are prominent landscape features. The Green Belt in this cell directly serves purposes 3 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
58. Dundry Ridge	✓ Checks the sprawl of Bristol	- Prevents the merger of Bristol with Dundry	✓ Safeguards mainly open agricultural land from encroachment.	-	✓ Adjoins south Bristol regeneration area.	This land to the south of Withywood and Hartcliffe forms part of the prominent, steeply sloping ridge to Dundry Hill. The extent of the built up area of Bristol forms the inner Green Belt boundary at a similar height along the ridge. The land is mainly open agricultural land with some woodland and includes the village of Dundry. The high ground and topography makes it a highly visible part of the Green Belt with the ridge providing a visual and physical limit to the built up area of Bristol. The Green Belt in this cell directly serves purposes 1, 3 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
59. Southeast of the A38 towards Highridge and Dundry	✓ Checks the sprawl of Bristol	-	✓ Safeguards mainly open agricultural land from encroachment	- The high ground is visible from western parts of the city. There are views to and from Ashton Court Estate	✓ Adjacent to south Bristol regeneration area	This land cell to the southeast of the A38 abuts the city at Highridge. The land rises progressively toward Dundry and the distinctive hill known as the Peart. The area is predominately open agricultural land although there is some development alongside the A38 and Dundry Lane. The Green Belt in this location has an effect of preventing coalescence of development on the A38 and thus restraining the sprawl of Bristol and towards the airport. The South Bristol link is under construction in the far north eastern section of the cell. This runs from north of Highridge Common towards the A38 near Castle Farm. The cell directly serves three Green Belt purposes.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
60. North of Bristol Airport, Felton, Barrow Gurney and south of A370 at Flax Bourton.	-	- Maintains the separation of villages and settlements (Felton, Potters Hill, Winford Barrow Gurney))	✓ Safeguards open agricultural land from encroachment. Some areas of quarrying	- Preserves the setting of Felton and the proposed Barrow Gurney Conservation Areas	✓	This land to the north of Bristol Airport, contains the villages of Felton and Barrow Gurney and encompasses land to the south of the A370 at Flax Bourton. It is mainly open agricultural land but has a significant areas of quarrying. The land slopes downwards towards Flax Bourton. The Green Belt in this location has a role in preventing coalescence of development on the A38 and thus restraining the sprawl of Bristol and towards the airport. The Green Belt in this directly serves purposes 3 and 5.
61. Land northwest and southeast of the A38 at Redhill, includes Butcombe, Numpnett Thrubwell and Blagdon Lake.	-	- Maintains the separation of villages and settlements (Redhill, Butcombe, Numpnett Thrubwell)	✓ Safeguards mainly open agricultural land from encroachment	-	✓	This land to the northwest and southeast of the A38 at Redhill includes Butcombe, Numpnett Thrubwell and Blagdon Lake. The land is open and undulating rising to the plateau at Bristol Airport. It is interspersed with small rural hamlets. The Green Belt directly serves purposes 3 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
62. Bristol Airport	-	-	✓ A proportion of the land is in airport uses, the area outside of this serves to safeguard the countryside from encroachment.	-	✓	Bristol airport sits on an elevated plateau. The terminal and built up areas were excluded from the Green Belt in the 2007 North Somerset Replacement Local Plan. Part of the land in the Green Belt is in use by the airport this includes the runway and surface car parking. The land to the south falls towards Redhill and is mainly open and visually prominent. The A38 passes through the western part of the cell. This cell mainly acts to contain the spread of development around the airport and serves purposes 3 and 5.
63. Land north of Wrington, south of Backwell extending to Yatton and Congresbury in the west	-	-	✓ The Green Belt safeguards the countryside which is heavily wooded and interspersed with farmland.	- The Green Belt abuts or includes parts of the conservation areas in Backwell and Wrington preserving their settings.	✓	This land cell straddling the A370 consists of wooded steep slopes (particularly to the west of the A370) and open farmland. The Green Belt abuts the villages of Wrington Claverham, Yatton, and Congresbury maintaining a substantial area of open land between Bristol and these settlements. The Green Belt directly serves purpose 3 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
64. Land to the southeast Nailsea and north of Backwell	-	✓ Maintains the separation of Nailsea and Backwell and the merger of this area with Bristol.	✓ Safeguards an area of lower lying open countryside which is mainly agricultural from encroachment	- Preserves the settling of the Farleigh conservation area at Backwell	✓	This cell comprises mainly open agricultural land. It is crossed north/south by the main railway line. This land directly serves purposes 2, 3 and 5.
65. Land to the north and east of Nailsea	-	✓ To the east prevents the merger of Nailsea with the Bristol urban area and to the north merger of Nailsea and Portishead. Maintains the separation of villages (between Nailsea and Tickenham and Wraxhall)	✓ Safeguards mainly open agricultural land from encroachment	-	✓	The cell comprises open agricultural land to the north of Nailsea, with a stream along the northern edge of the cell. The Green Belt in this cell directly serves purposes 2, 3 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
66. A370 corridor between Backwell and Long Ashton Land and southwest of Clevedon Road near Wraxall	-	✓ The Green Belt serves to prevent merger between Bristol and Nailsea/ Backwell, Maintains separation of villages (Flax Bourton and Farleigh with Long Ashton)	✓ Safeguards predominantly agricultural land and some woodland to the south from encroachment	- Preserves the setting of the conservation area at Farleigh, Backwell	✓	Predominantly open agricultural land and some woodland This land cell follows the lower lying land between steeply sloping land to the north and south. It is bounded to the northeast by Clevedon Road and includes the A370 corridor as well as the village of Flax Bourton and the newer development at the former Farleigh hospital site. The Green Belt directly serves purposes 2, 3 and 5.
67. Land between the A38 and the railway line including Woodspring Golf club and Barrow Hospital	✓ With cell 68 to the east, prevents the sprawl of the Bristol in this direction	✓ Prevents the merger of Nailsea, Long Ashton and Bristol.	✓ Safeguards open countryside which includes agricultural land, a golf course, woodland and a reservoir from encroachment.	- Preserves the setting of the conservation area at Yanley.	✓ Adjacent to the south Bristol regeneration area	The land to the east of Monarchs Way public footpath is predominantly open. West of Monarchs Way the land is more wooded and contains the former Barrow Hospital, reservoir and associated water works development. The land sits between the ridge at Dundry to the south and the steep ridge to the north of Long Ashton. The cell directly serves purposes 1, 2, 3 and 5 of the Green Belt.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
68. Land bounded by the A38, Yanley Lane and the railway line, including Bedminster Down.	✓ Checks the sprawl of Bristol	✓ Prevents the merger of Nailsea, Long Ashton and Bristol.	✓ Safeguards open agricultural and recreational uses from encroachment	- Preserves the setting of the conservation area at Yanley and includes views from the higher ground towards the Avon Gorge and the Suspension Bridge.	✓ Adjacent to the south Bristol regeneration area.	This land cell to the east of Yanley Lane abuts the city at Ashton Vale and Bedminster Down. The cell contains a sleep sided valley adjacent to Hanging Hill wood. This open, green wedge penetrates into the built up area on the higher ground at Bedminster Down. The area is predominately agricultural. It also contains the Yanley landfill site which is being restored and some outdoor recreation. The South Bristol link is under construction bisecting this cell from the A38 to the railway line. The Green Belt directly serves purposes 1, 2, 3 and 5 of the Green Belt.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
69. Land to the east of Long Ashton	✓ Checks the sprawl of Bristol	✓ This area prevents the merger of Long Ashton and Bristol	✓ Safeguards agricultural land although land uses also include a Park and Ride, the Long Ashton bypass and South Bristol Link which is under construction.	- Preserves the setting of the Long Ashton and Yanley Conservation Areas. Also helps preserve the setting of the grade 1 Ashton Court Estate.	✓ Adjacent to south. Bristol regeneration area	Most of this land to the east of Long Ashton is in open agricultural use. It is also the site of a park and ride facility. It is crossed by route corridors including the route of the SBL which is currently under construction. Planning permission was granted under reference 09/02242/P (Bristol City Council) for the development of a football stadium, 253 dwellings and other uses. This is no longer being pursued and so the land remains open. The land directly serves purposes 1, 2, 3 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
70. Ashton Court, Leigh Woods	✓ Land is immediately adjacent to the Avon Gorge. The river and gorge provide a significant physical boundary. The Green Belt prevents the sprawl of Bristol extending beyond this boundary.	- The Green Belt serves to maintain the separation of settlements (Abbots Leigh, Leigh Woods and Long Ashton)	✓ The land safeguards the countryside from encroachment.	✓ Preserves an open setting for the Gorge and Suspension Bridge, preserves the setting of the conservation areas in Clifton, central Bristol and Leigh Woods. Also contains the Ashton Court Estate.	✓	Area of land including the open environment of the Ashton Court Estate and Leigh Woods to the west of the Avon Gorge with extensive recreation uses. Land is heavily wooded including the ridge to the north of Long Ashton. Area also includes nationally important environmental designations. The cell directly serves purposes 1, 3, 4, and 5.
71. Wraxall, Failand, the Tyntesfield Estate to the west of Long Ashton	-	✓ Helps prevent the merger of Nailsea, Long Ashton and Bristol	✓ This land safeguards the countryside from encroachment. There is also significant recreational and agricultural use	- The Green Belt assists in preserving the setting of Tyntesfield House and the country estate.	✓	This area forms part of the steep sided ridge in the vicinity of Wraxhall and Failand and includes the Tyntesfield estate (National Trust). The area is primarily open and undeveloped, with heavily wooded areas, agricultural land and open recreation uses. The Green Belt in this cell directly serves purposes 2, 3 and 5

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
72. Tickenham Ridge	-	✓ Prevents the merger of Portishead and Nailsea. Maintains the separation of villages and settlements (Tickenham, Wraxall)	✓ Safeguards mainly open agricultural land and woodland from encroachment	-	✓	Steeply sloping ridge to the north of Nailsea and south of the M5. Primarily open land which includes the village of Tickenham and residential development at Cadbury Camp Lane. Directly serves purposes 2, 3 and 5.
73. Northeast of Clevedon	- Prevents the spread of Clevedon to the northeast.	✓ Prevents the merger of Clevedon and Portishead	✓ Safeguards areas of woodland and agricultural land from encroachment	- Preserves the setting of Walton Conservation Area	✓	Area of land to the northeast of Clevedon includes steeply sloping ridges separated by the Gordano Valley. Open agricultural land, woodland and a golf course. The Green Belt in this cell directly serves purposes 2, 3 and 5.
74. Southwest of Portishead	- Prevents the spread of Portishead to the south and southwest.	✓ Prevents the merger of Clevedon and Portishead. Maintains the separation of villages (Weston in Gordano) from Portishead.	✓ Safeguards open countryside including from encroachment	- Part of the wider setting of Portishead and preserves the setting for the Weston in Gordano Conservation Area	✓	Open agriculture and extensive woodland. Area of higher ground between the coast and the Gordano Valley including Portishead Down. The Green Belt directly serves purposes 2, 3 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
75. Gordano Valley	-	✓ Prevents the merger of Portishead and Nailsea and maintains the separation of Clapton in Gordano and smaller settlements	✓ Safeguards open countryside from encroachment.	-	✓	Visually prominent area of land to the north of the M5 motorway primarily in open agricultural or nature conservation use. Includes the villages of Clapton in Gordano and part of Weston-in Gordano. Part of cell is designated as Gordano National Nature Reserve The Green Belt in this cell directly serves purposes 2, 3 and 5
76. Area at Sheepway between the Royal Portbury Dock and Portishead	✓ Checks the urban sprawl associated with Bristol Port (Portbury)	✓ Maintains the separation of the Bristol urban areas at Bristol Port from Portishead	✓ Safeguards the countryside and environmental designation in this area from encroachment	-	✓	Area of open countryside between the Port and Portishead at Sheepway containing Portbury Wharf Nature Reserve and agricultural land. Adjoins Bristol Port. The Green Belt is this cell was designated in the North Somerset Replacement Local Plan 2007. Directly serves purposes 1, 2, 3, and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
77. Small parcel of land between the M5 and Easton-in-Gordano	✓ Helps to contain the urban sprawl of Bristol Port	-	✓ Safeguards some open agricultural land from encroachment	-	✓	Small parcel of land between the M5 and Easton in Gordano. Comprises open agricultural land and river bank area. There is some development including a motorway service station. The M5 motorway and a branch railway line pass through the cell. It adjoins Bristol Port. Directly serves purposes 1, 3 and 5.
78. Area to the south of the A369, north of the B1328 including Portbury and Lower Failand	-	- Maintains the separation of villages and settlements (Portbury, Lower Failand, Easton-in-Gordano	✓ Safeguards countryside which is mainly agricultural and woodland.	-	✓	Area of undulating open countryside with some prominent steep slopes. This cell directly serves purposes 3 and 5.

Cell No. Name	Purpose					Description and Commentary
	1. To check the unrestricted sprawl of large built-up areas	**2 To prevent neighbouring towns merging into one another**	**3. To assist in safeguarding the countryside from encroachment**	**4. To preserve the setting and special character of historic towns**	**5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land**	
79. East of Easton-in-Gordano including Ham Green and Leigh Court	✓ Land is immediately adjacent to the River Avon which provides a significant physical boundary. The Green Belt prevents sprawl of Bristol extending beyond this boundary.	- Maintains separation of villages (Ham Green from Pill) and whilst the river forms a strong defensible boundary the Green Belt prevents the merger of Bristol with Easton-in-Gordano.	✓ Safeguards mainly agricultural land	- Preserves the setting of the designated historic park and garden of Leigh Court.	✓	Area to the east of Easton in Gordano and south of the River Avon. Mainly open agricultural land and part of the Leigh Court estate with its parkland and woodlands. It includes a developed area, comprising residential development and a business park, at the former Ham Green hospital. The Green Belt in this cell directly serves purposes 1, 3 and 5.

Figure 1 – Bristol Bath Green Belt

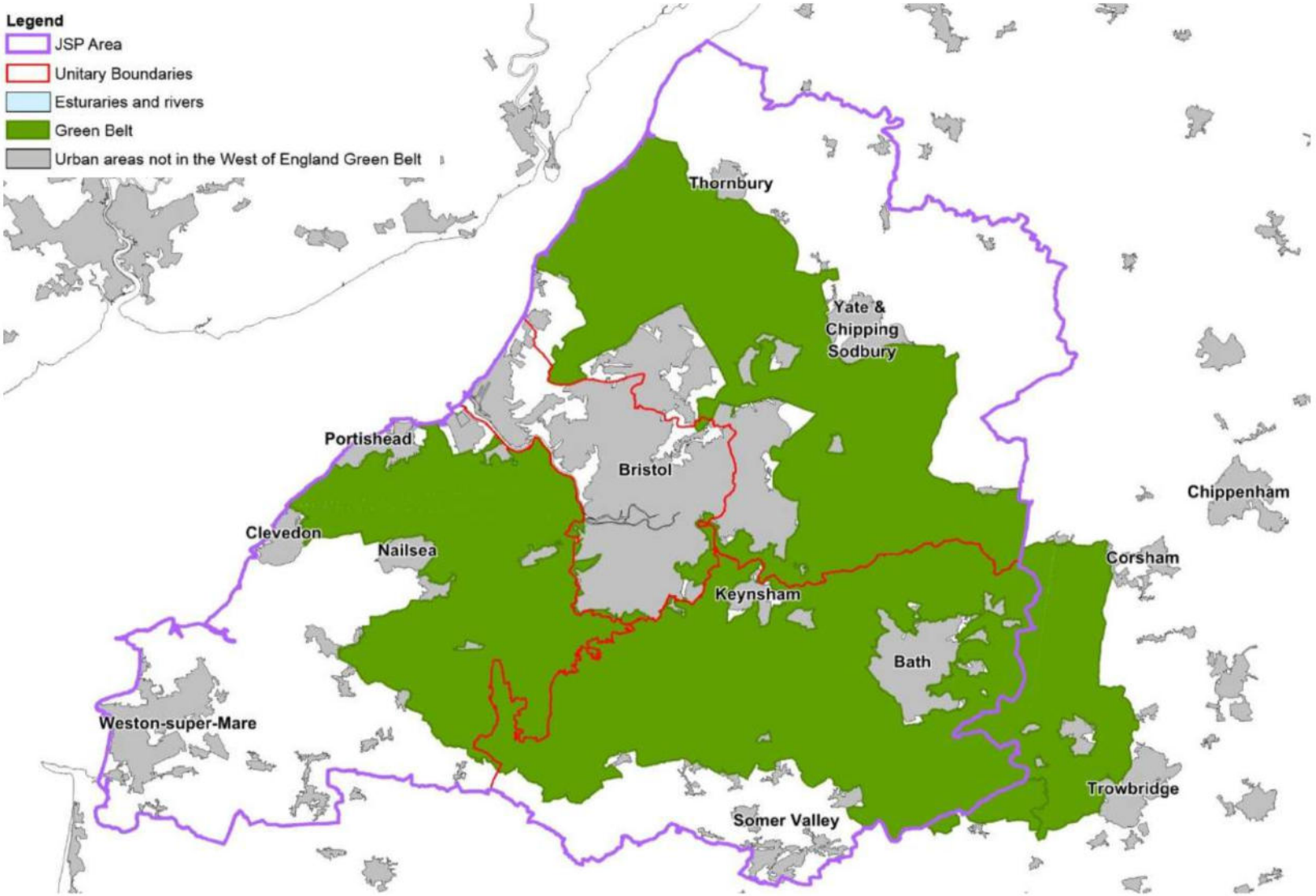


Figure 2 – Cells serving purpose 1

Check the unrestricted sprawl of large built-up areas

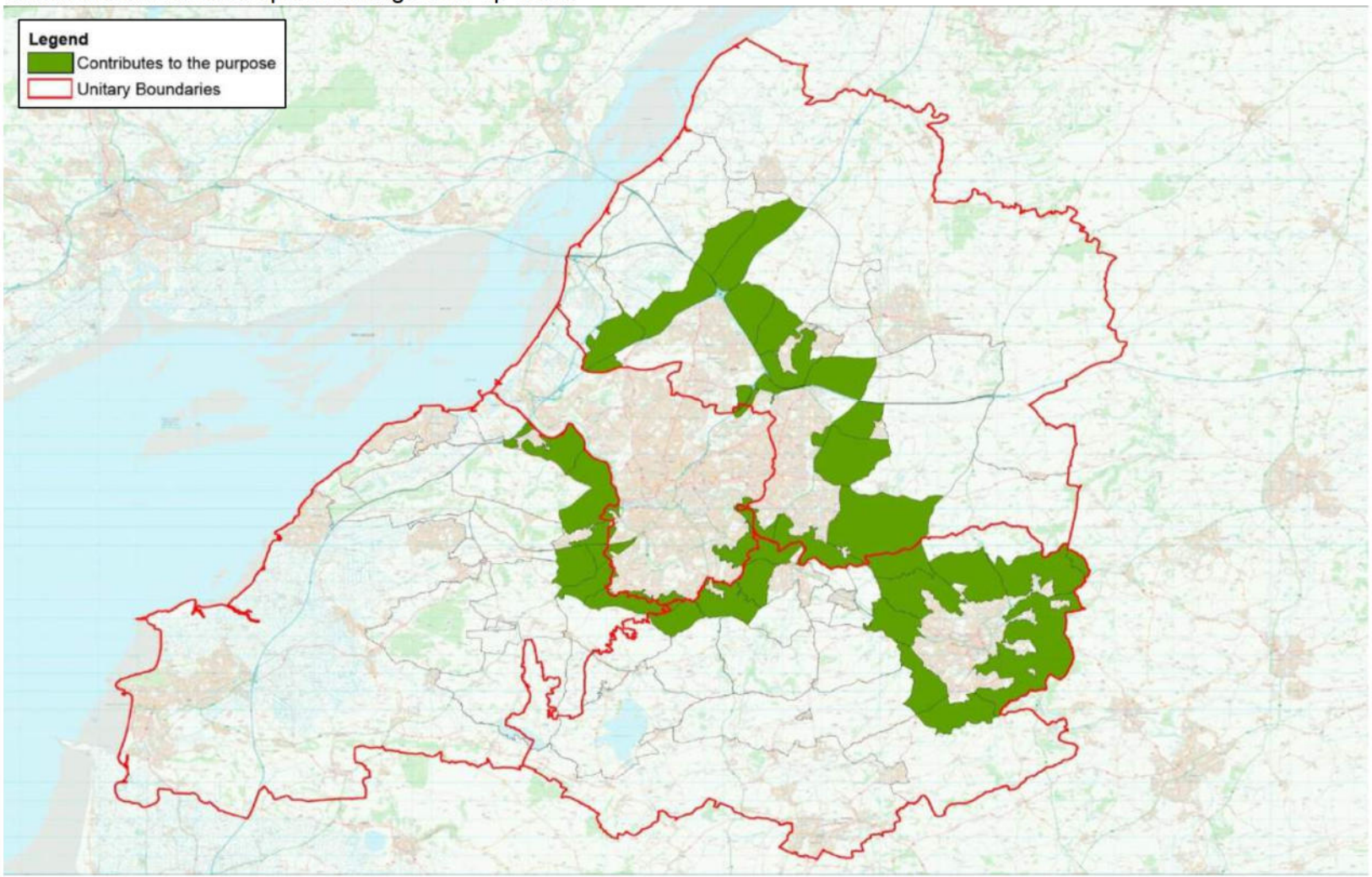


Figure 3 – Cells serving purpose 2

Prevent neighbouring towns merging into one another

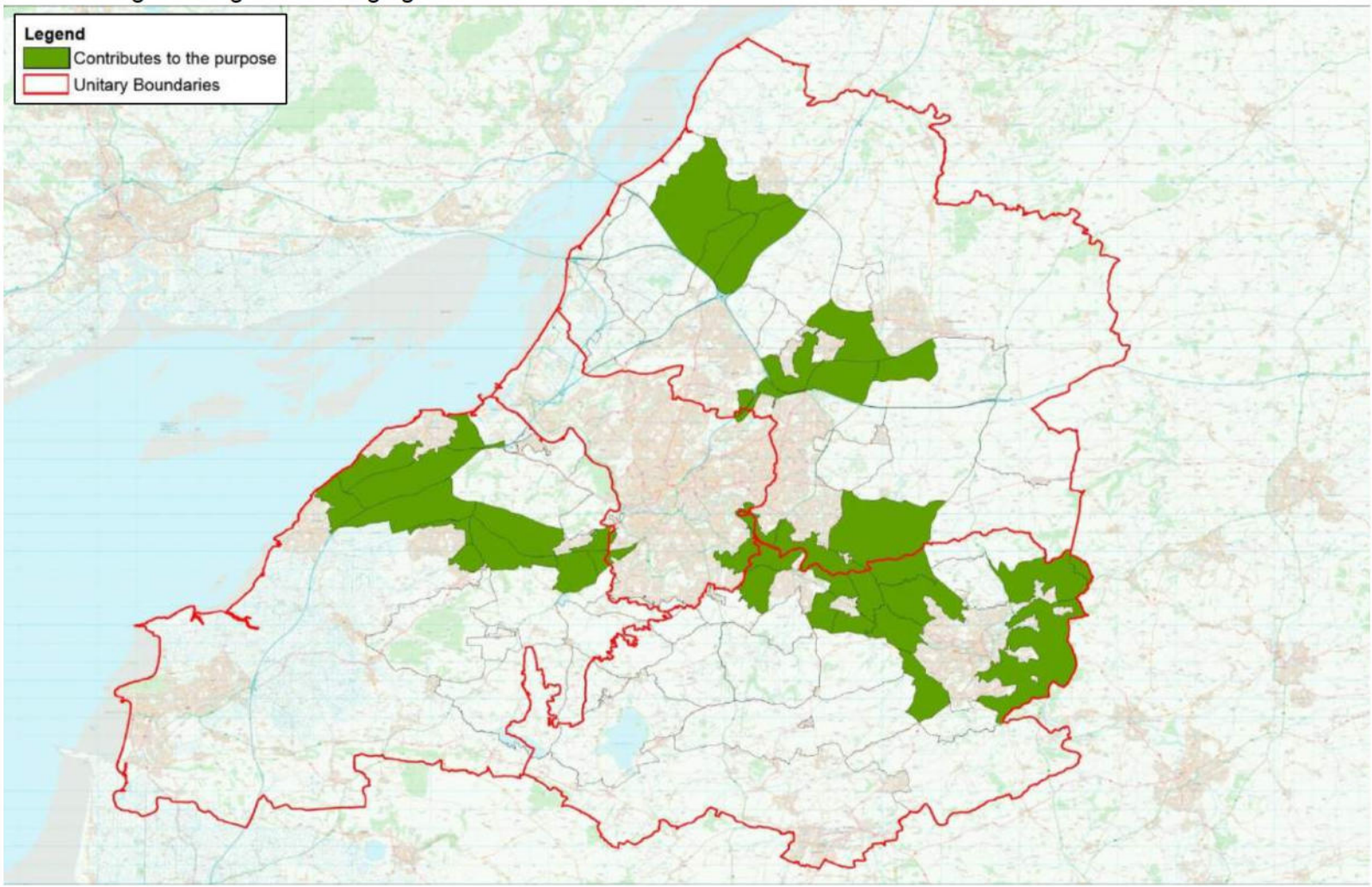


Figure 4 – Cells serving purpose 3

Assist in safeguarding the countryside from encroachment

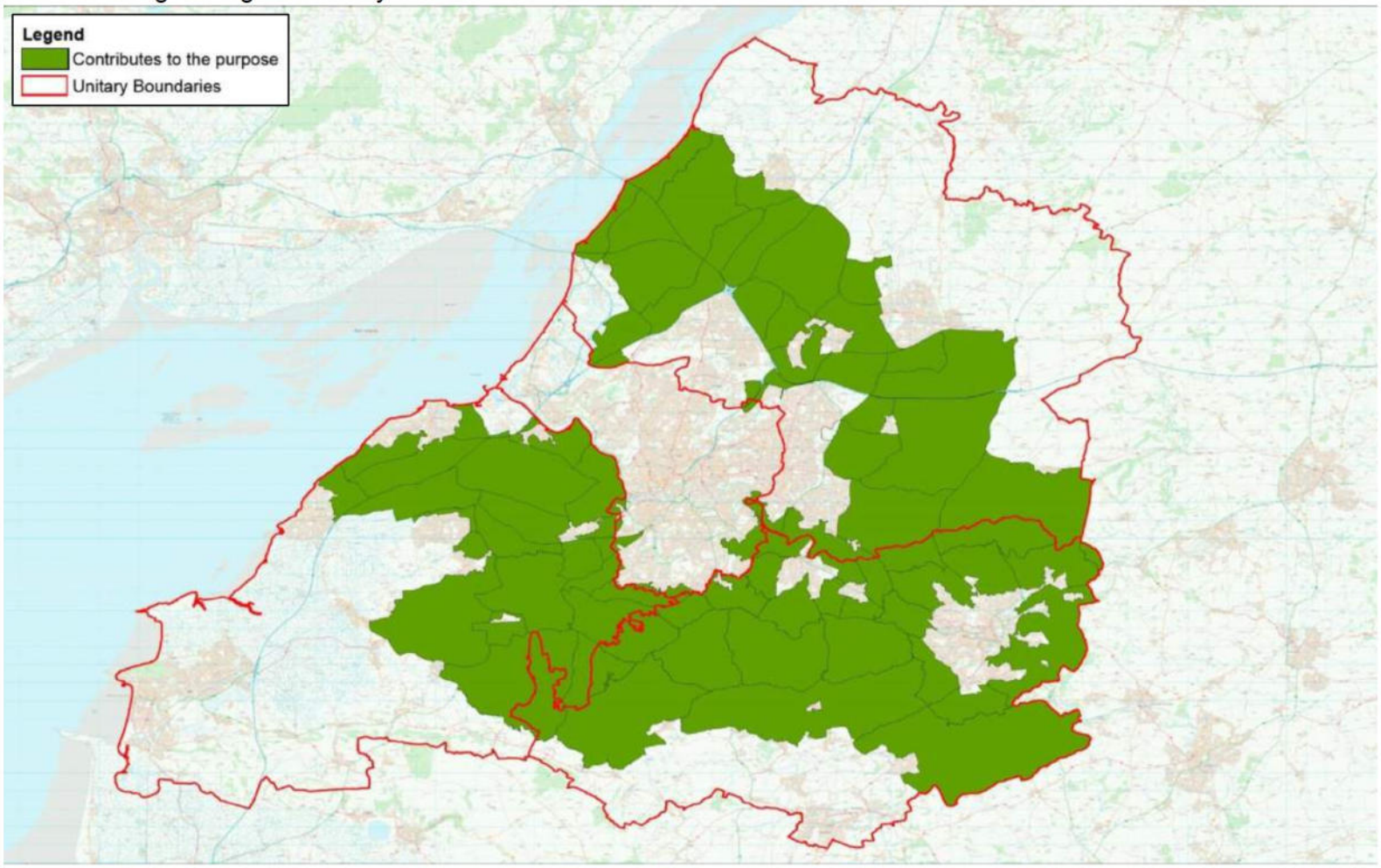


Figure 5 – Cells serving purpose 4

Preserve the setting and special character of historic towns

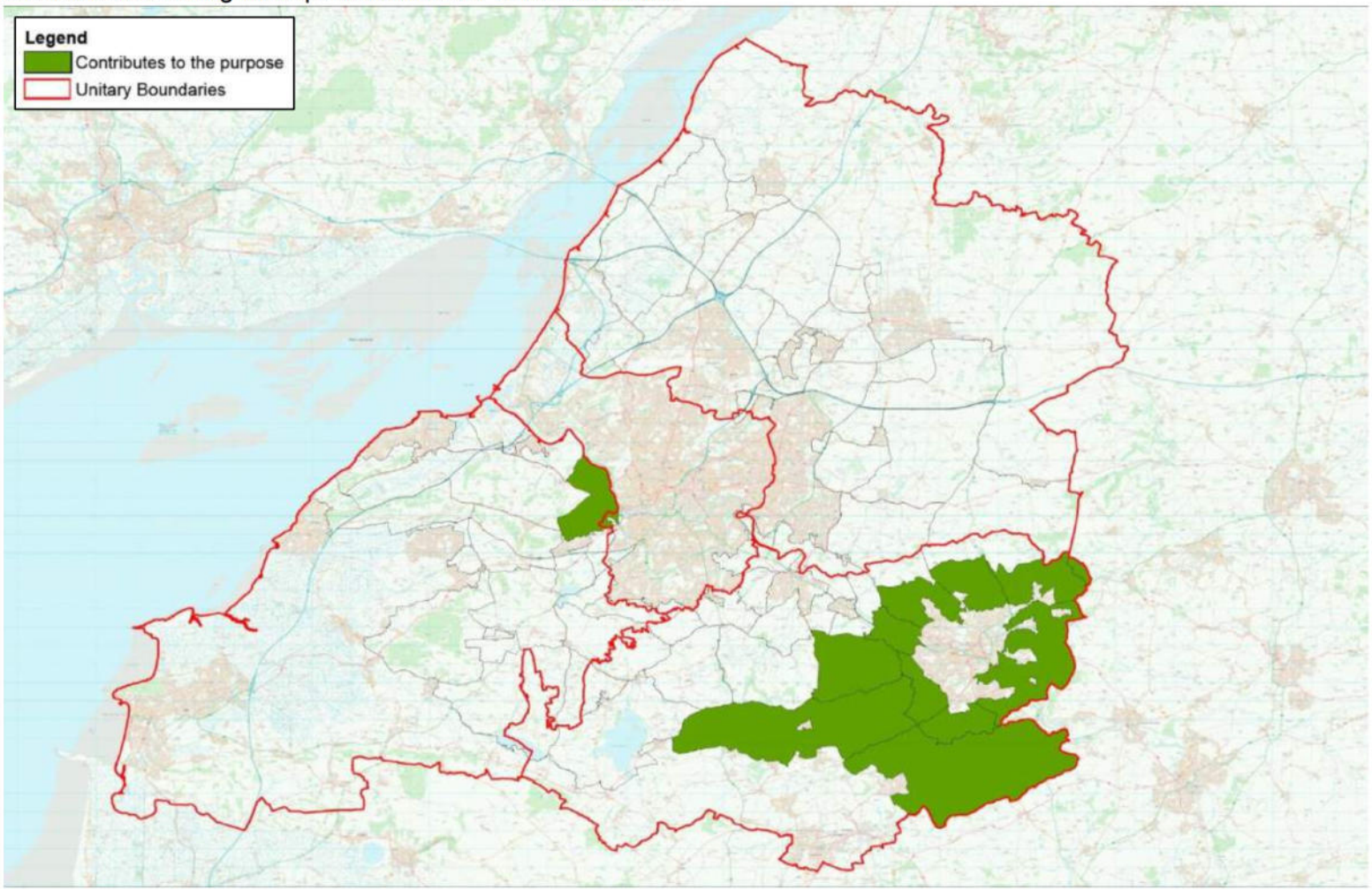
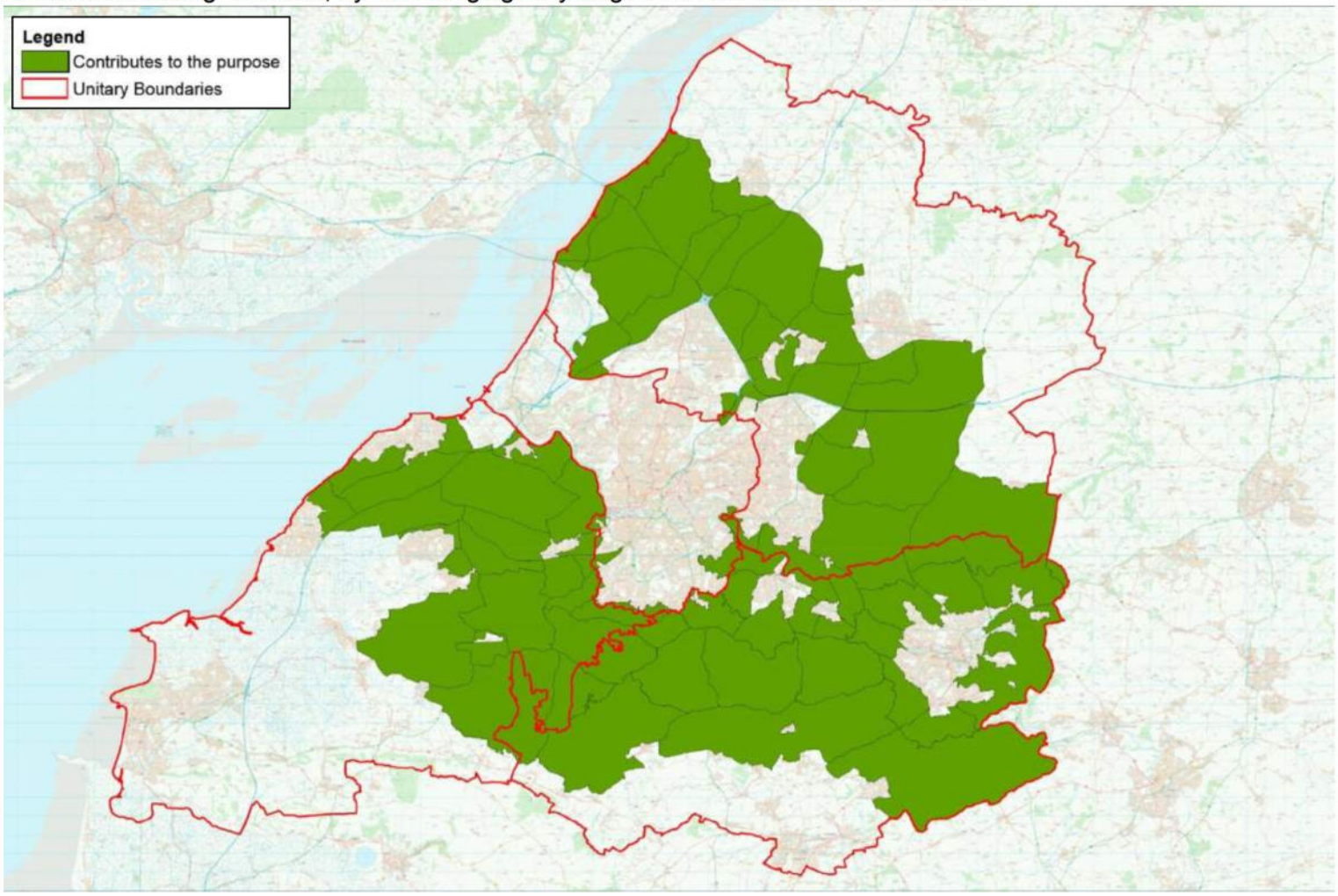


Figure 6 – Cells serving purpose 5

Assist in urban regeneration, by encouraging recycling of derelict and other urban land



Appendix 2 – Local Plan policies

Bath and North East Somerset

Extract from Bath and North East Somerset Core Strategy July 2014

Green Belt

6.61 Green Belts are designated primarily in order to prevent urban sprawl by keeping land permanently open. As such they help to shape patterns of urban development, protect the countryside and provide opportunities for outdoor sport and recreation. Within B&NES the Green Belt also plays a vital role in maintaining the setting of the World Heritage Site of Bath and the surrounding villages. It is also important in preventing the coalescence of these villages with the city.

6.62 The purposes and objectives of Green Belt within B&NES are summarised below and generally reflect advice set out in national policy.

6.63 Core Policy CP8 conforms with national policy which also states that the general extent and detailed boundaries of the Green Belt should be altered only exceptionally. The Core Strategy retains the general extent of the Green Belt in B&NES other than the removal of land from the Green Belt for development on the edge of Bath and Keynsham and at Whitchurch as set out in Policy DW1 and Policies B3A, KE3A, KE3B, KE4 and RA5. The Placemaking Plan provides the opportunity for a review of the inner detailed boundary, such as to address anomalies. In accordance with the NPPF Green Belt boundaries will only be altered in exceptional circumstances.

6.63A In altering the Green Belt and allocating strategic sites for development and in response to the NPPF paragraph 85, the need to identify safeguarded land to meet longer term development requirements has been considered. At Odd Down on the edge of Bath environmental sensitivity means that there is no scope to identify safeguarded land. It is also considered there is no scope to identify safeguarded land at south west Keynsham. However, land is safeguarded for development East of Keynsham. At Whitchurch the need for and scope to identify safeguarded land will be considered as part of the Core Strategy review.

6.64 In light of the opportunities for development in the plan period, most of the urban area of Keynsham continues to be excluded from the Green Belt and a revised inner boundary is defined on the Policies Map. There are a number of villages which meet the requirements of national policy in the NPPF and continue to be excluded from the Green Belt as established in the Bath & North East Somerset Local Plan. Given the overall level of housing required during the plan period and the spatial strategy for meeting this requirement it is not considered that exceptional circumstances exist to warrant changing the Inset boundaries for these villages. Some sites may come forward in the Green Belt under the Government's proposals for Community Right to Build.

6.64A Within the Green Belt a number of Major Existing Developed Sites (MEDS) are defined on the Policies Map. Within the B&NES Local Plan Policy GB.3 allows for limited redevelopment or infill which does not harm the openness of the Green Belt or affect the purposes of including land within it. Within the context of national policy the Council will, through the Placemaking Plan, be reviewing whether MEDS should continue to be designated and, if so, the sites to be designated and their boundaries.

POLICY CP8 Green Belt
The general extent of the Green Belt is set out on the Core Strategy Key Diagram. The detailed boundaries and inset villages are defined on the Policies Map. The openness of the Green Belt will be protected from inappropriate development in accordance with national planning policy.
Delivery*:* *Delivery will be through the Development Management process. The Existing Buildings in the Green Belt SPD will continue to guide decisions on proposals within the Green Belt.*

Table 8 – Bristol/Bath Green Belt within Bath and North East Somerset

Bristol/Bath Green Belt within Bath and North East Somerset	
Purposes of including land in the Green Belt: 1. To check the unrestricted sprawl of Bath and Bristol. 2. to prevent the merging of Bristol, Keynsham, Saltford and Bath. 3. To assist in safeguarding the countryside from encroachment. 4. To preserve the setting and special character of Bath. 5. To assist in urban regeneration of Bath and Bristol by encouraging the recycling of derelict and other urban land. 6. To preserve the individual character, identity and setting of Keynsham and the villages and hamlets within the Green Belt.	Objectives for the use of land in the Green Belt: 1. To provide opportunities for access to the open countryside for the urban populations of Bath, Bristol, Keynsham and Norton Radstock. 2. To provide opportunities for outdoor sport and outdoor recreation near Bath, Bristol and Keynsham. 3. To retain attractive landscapes and enhance landscapes. 4. To improve damaged or derelict land. 5. To secure nature conservation interests. 6. to retain land in agricultural, forestry and related uses.

Bristol

Extract of Bristol Core Strategy June 2011

Green Belt

4.6.1 This policy indicates the broad extent of the Green Belt within Bristol and the approach to development within it. It also addresses the possibility of urban extension development in the Green Belt beyond the city boundary. The policy will directly contribute to meeting objectives 1, 5 and 7 of the Core Strategy and responds to issue 11.

Context

4.6.2 Most of the Green Belt surrounding Bristol lies within the neighbouring local authorities. Within Bristol's boundaries Green Belt covers a small area to the east of the city beside the M32 motorway with several tracts of Green Belt land on the city's southeastern, southern and southwestern boundaries. The key characteristic of the Green Belt is its openness and all areas contribute to meeting the purposes of designation. In several locations, including Ashton Court, Bedminster Down, the slopes at Dundry, Stockwood and the Avon Valley, Green Belt land also forms very prominent elements of the city's landscape setting.

4.6.3 The Green Belt plays a strategic role in containing the outward expansion of Bristol, providing a green setting for the city and focusing attention upon the regeneration of previously developed land in the urban area.

4.6.4 The delivery of the number of new homes proposed in BCS5 does not require development of Green Belt land in Bristol within the period of the Core Strategy. However, Policy BCS5 allows for possible development in the Green Belt, including land at southeast Bristol as a long-term contingency. Development at this location would need to be demonstrated to be both appropriate and sustainable.

Policy BCS6

Countryside and other open land around the existing built-up areas of the city will be safeguarded by maintaining the current extent of the Green Belt.

Land within the Green Belt will be protected from inappropriate development as set out in national planning policy.

Proposals for urban extensions in the Green Belt beyond Bristol City Council's boundaries may emerge through the development plans of neighbouring authorities. If appropriate proposals come forward the council will continue to work with the adjoining authorities to consider the impact on existing areas, to assess infrastructure requirements and to ensure integrated and well-planned communities are created to the benefit of existing and future residents.

Explanation

4.6.5 This policy complements the priority given to regeneration and the redevelopment of previously developed land and reflects the very high value attached by the community of Bristol to the openness of the surrounding countryside. The policy conforms with national policy, which states that the general extent and boundaries of the Green Belt should be altered only exceptionally.

4.6.6 The Core Strategy proposes to maintain the Green Belt unchanged. However, it is recognised that if an urban extension is developed *outside* the city boundary this could fundamentally alter the role of Green Belt land *inside* the boundary in that area. In such circumstances this role would need to be reviewed.

North Somerset

Extract from North Somerset Core Strategy – Adopted 2012

CS6: North Somerset's Green Belt

Within North Somerset the boundaries of the Bristol - Bath Green Belt will remain unchanged during the plan period.
Further amendments to the Green Belt at Bristol Airport will only be considered once long-term development needs have been identified and exceptional circumstances demonstrated.

This policy contributes towards achieving Priority Objective 7.

Background

3.92 The fundamental aim of the Green Belt is to prevent urban sprawl by keeping land permanently open, the most important characteristic of the Green Belt being its openness. Green Belts perform five important functions in:

- preventing urban sprawl
- preventing towns from merging into one another
- safeguarding the countryside from encroachment
- preserving the setting and character of historic towns**?**
- helping urban regeneration, by encouraging the recycling of underused and outworn urban
- land and buildings.

3.93 The Joint Replacement Structure Plan (2002) set out the general extent of the Bristol - Bath Green Belt, with the detailed boundaries defined through the North Somerset Replacement Local Plan (2007).
3.94 The protection and maintenance of the Green Belt is very important to the affected communities, and ensures a clear distinction between urban Bristol and rural North Somerset. It makes an important contribution to their local character and distinctiveness, and is highly valued and strongly supported.
The Core Strategy approach
3.95 A key feature of Green Belts is their permanence. Green Belts are intended to be a long-term designation. Taking account of the recent changes to the Green Belt through the Replacement Local Plan (2007) and absence of any need for large scale further revisions to either the general extent or detailed boundaries of the Green Belt, no changes to the Green Belt are proposed in the Core Strategy.

3.96 There are two existing strategic developments which are constrained by Green Belt within North Somerset:

Bristol Airport

3.97 The Replacement Local Plan created an inset in the Green Belt to accommodate the medium term expansion requirements of Bristol Airport. Further Green Belt amendment would be premature in advance of exceptional circumstances being demonstrated through evidence regarding future expansion and its land use implications.

Royal Portbury Dock

3.98 The issue of port expansion was addressed through the Replacement Local Plan and land removed from the Green Belt and safeguarded for future port use. There is no further suitable, developable land remaining between the Port and the M5, and therefore no further Green Belt amendment is proposed.

How and where the policy will be delivered

3.99 Through applying the strong presumption against inappropriate development within the Green Belt.

Monitoring and review

3.100 Performance will be monitored by the assessment of planning applications, and developments within the Green Belt.

Note: Following a legal challenge to the Core Strategy Policy CS13 (scale of new housing) was found to be unlawful and as a consequence a set of other policies were remitted for re-examination including CS6 (North Somerset's Green Belt). A new housing requirement has now been adopted and consultation on the remaining remitted policies will take place in November-December 2015. No change to the wording of Policy CS6 is proposed.

South Gloucestershire

Extract from North Somerset Core Strategy – Adopted 2012

POLICY CS5 – LOCATION OF DEVELOPMENT

In order to deliver the Strategy for Development, the framework for the location and scale of development is:

1. Most new development will take place within the communities of the North and East Fringes of Bristol urban area:

- **The focus will be the development of existing commitments and the remaining South Gloucestershire Local Plan allocations, together with delivery of the Greater Bristol Bus Network, and the planning for the West of England transport package and future schemes; and**
- **New neighbourhoods of sustainable communities will be developed at Cribbs/Patchway and to the east of Harry Stoke;**

2. At Yate/Chipping Sodbury, new development will be of a scale appropriate

to achieve greater self-containment and to improve the separate but inter-related roles and functions of the towns, focusing on investment in the town centres and improving the range and type of jobs;

- **Provided infrastructure, particularly sewerage infrastructure, is delivered, a new neighbourhood at north Yate will be developed, supported by a package of transport measures and a new local centre;**

3. **At Thornbury, new development will be of a scale appropriate to revitalise the town centre and strengthen community services and facilities;**

4. **The economic potential of Severnside will be realised as a strategic location for a range of employment uses, subject to the resolution of flood risk, environmental and infrastructure issues and taking into account the most recent government legislation and guidance;**

5. **In the rural areas communities will be empowered to shape the future of their own local area through opportunities presented by Neighbourhood Planning.**

Outside the Green Belt (including settlements surrounded by the Green Belt):

(a) Small scale development may be permitted within the settlement boundaries of villages defined on the Policies Map.

(b) Defined settlement boundaries will be maintained around rural settlements and reviewed in the Policies, Sites and Places DPD or a replacement Core Strategy/Local Plan or Neighbourhood Plan. A review of the approach to the distribution of housing in the rural areas will be undertaken which will include engagement with the local community and other stakeholders/parties;

(c) In villages and other settlements without defined settlement boundaries, new development will be strictly controlled, but small scale development within or well related to villages or settlements may come forward through Neighbourhood Planning initiatives and rural housing exception site policy.

(d) Any changes/proposals should be commensurate with the locality in terms of its form, character and landscape and cumulatively acceptable when considered with any other development identified in the Core Strategy, Policies Sites and Places DPD, replacement Local Plan or Neighbourhood Plans.

(e) in the open countryside, new development will be strictly limited.

6. **The extent of The Green Belt will remain unchanged from that shown in the South Gloucestershire Local Plan, except to the east of Harry Stoke/Stoke Gifford (north of the A4174 Avon Ring Road), and to the west of the A4018 where the need to: meet future housing requirements; ensure sustainable patterns of development; create and plan comprehensively for sustainable communities; are the exceptional circumstances in which land will be removed from the Green Belt at these**

locations. In addition, the visual impact of the proposed Stoke Gifford Transport Link on the openness of the Green Belt to the east of Harry Stoke/ Stoke Gifford (north of the A4174 Avon Ring Road) is also considered to provide an exceptional circumstance which justifies the release of this land from the Green Belt.

Elsewhere in the Green Belt:

(a) small scale infill development may be permitted within the settlement boundaries of villages shown on the Policies Map. Settlement boundaries will also be reviewed through the Policies Sites and Places DPD or a replacement Local Plan or a Neighbourhood Plan.

(b) Development brought forward through a Community Right to Build Order is not inappropriate development in the Green Belt, provided it ~~in~~ accord~~ance~~ with Government policy.

(c) Other proposals for development in the Green Belt will need to comply with the provisions in the NPPF or relevant local plan policies in the Core Strategy.

7. The sequential and exceptions tests will be applied to direct development to areas with the lowest probability of flooding, taking account of the vulnerability of the type of development proposed, its contribution to creating sustainable communities and achieving the sustainable objectives of the Core Strategy.

Stansted:
Unit 1, The Exchange,
9 Station Road, Stansted, CM24 8BE

t +44 (0)1279 647044
e office@lizlake.com
www.lizlake.com

Bristol:
1 Host Street,
Bristol, BS1 5BU

t +44 (0)117 927 1786

Nottingham:
Sutton Place, 49 Stoney St,
Nottingham NG1 1LX

t +44 (0)115 784 3566

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS

- Landscape Design
- Urban Design
- Residential
- Public Realm
- Masterplanning
- Landscape Planning
- Heritage Landscapes
- Gardens and Estates
- Restoration and Conversion
- Places of Worship
- Expert Witness
- Hospitality
- Education
- Retail / Office
- Community
- Ecology
- Arboriculture
- 3D / Graphic Design

Woodlands Garden Village, Bristol

Landscape Briefing Note

19th December 2016

1 INTRODUCTION

1.1 This Briefing Note has been prepared by Liz Lake Associates on behalf of [redacted] to summarise the relevant landscape related issues relating to development at the Woodlands Golf Course site, Bristol (the Site).

1.2 A series of three studies have been carried out for the Site by Liz lake Associates in December 2016 in order to fully assess the landscape constraints relating to development on the Site, these include the following:

- Strategic Landscape and Visual Assessment (SLVA)
- Landscape Sensitivity and Capacity Study (LSC)
- Green Belt Assessment (GBA)

1.3 Below is a short summary of the findings of the above three studies and how this has informed the development of the masterplan proposals.

2 SUMMARY OF FINDINGS

Summary of landscape and visual issues

2.1 Landscape issues relating to the Site include the following (refer to: SLVA by Liz lake Associates, December 2016):

- The implementation of residential development on the Woodlands site would result in a direct change in the character of the landscape on the Site resulting from its change in use. The contained nature of the Site means that the Site has limited influence in the wider landscape, potentially resulting in limited landscape effects from development.

- The landscape resource of the Site is considered to be of *medium/low susceptibility* to the effects of development; defined in the methodology as *"a damaged or robust landscape where appropriate change can be absorbed and could contribute to the restoration of key characteristics, individual elements or features and specific aesthetic or perceptual aspects or, overall local landscape character."*

2.2 Visual issues relating to the Site include the following (refer to: SLVA by Liz lake Associates, December 2016):

- Views across the Site from within its boundaries are not typical of the local landscape character. Only occasional landscape features on Site are typical of surrounding landscapes. Views out of the Site are relatively well contained by the combined effects of these features.

- Dwellings immediately to the north of the Site along Gaunts Earthcott Lane, and users of public footpaths in the vicinity, are some of the more sensitive visual receptors that would be likely to experience the most harmful visual effects. With landscape mitigation and enhancement measures incorporated into the design, particularly in the northern parts of the Site, it would be possible to mitigate any potential localised significant visual effects over a period of time.

- To the north-west, potential glimpsed views of the Site are available from the edge of Tockington Park Wood and Tockington Farm, although likely to be partly obscured. Dwellings on Woodhouse Ave and along South Road have back gardens and play areas facing the Site, with potential views of the Site from second storey windows and communal play areas. It is unlikely that views from this residential area would experience significant effects, particularly if appropriate mitigation measures are implemented.

- Views of the Site from Hortham Village on the north side of the motorway junction offer nearby views of the motorway and the north-western Site boundary but it is unlikely that any significant effects would be experienced from this location.

- Views from the south of the Site, from Trench Lane and the West Country Water Park are unlikely to result in significant effects as there are no sensitive receptors in these locations.

Summary of landscape sensitivity and capacity issues

2.3 Using an industry recognised and accepted methodology, the Landscape Sensitivity and Capacity Study found that the Site at Woodlands has a Medium to High Capacity to accommodate change. This means that appropriately designed development could be accommodated within the landscape, with some mitigation required.

2.4 The alternative sites of Buckover and Charfield were also assessed using the same methodology and have both been found to have Low Capacity to accommodate change. This means that development is likely to have an adverse effect on the quality and value of these landscapes.

Summary of Breen Belt issues

2.5 The Green Belt Review identifies limitations in the methodology used for the West of England JSP Green Belt Assessment, e.g. large cell size within which considerable variation occurs with regard to physical and visual containment. The Site is considered to represent a significant departure from the remainder of the landscape within Cells 14 and 15 in these terms.

2.6 From the Site-specific assessment made by LLA, based on an adjusted methodology, it is considered that the Site would not cause significant harm to the Green Belt should it be released for low-rise, medium/low-density residential development.

---

3 LANDSCAPE INPUT TO MASTERPLAN

3.1 During the study, co-ordination took place between the members of the project team to inform the development of the masterplan. The following is a summary of the advice provided in relation to the evolving masterplan.

3.2 Green infrastructure and access:

- Consideration of linked green infrastructure, drainage and connectivity (walking and cycling) across the Site should inform the arrangement of the layout at the earliest stage of the project;
- The Brook and Ditch to the east of the Site are key landscape features; their influence on the proposals should be maximised, particularly in relation to SuDS, green infrastructure, biodiversity, recreation and access;

- The potential for the introduction of blocks of native broadleaf woodland should be explored within the buffer areas/boundaries as an opportunity for visual mitigation and contribution to landscape character;
- Proposals should demonstrate improved access and connectivity within the Site and to surrounding areas by exploiting connections to existing rights of way surrounding the Site; and
- Existing native hedgerows should be retained and strengthened or enhanced where possible.

3.3 Views:

- The Site is visually well contained, primarily due to the influence of the motorways and the engineered mounds on the western boundary, but also because the majority of the Site is not exposed on raised ground, nor is it overlooked by viewpoints on surrounding ridges; and
- The most sensitive views of the Site are from around Gaunts Earthcott at the north-east of the Site, from Hortham Lane, Gaunts Earthcott Lane and the surrounding farms and public footpaths, and therefore visual mitigation should account for this, particularly on the northern and eastern Site boundaries.

3.4 Site heritage:

- When considering potential landscape effects and enhancements, it would be beneficial to understand the Site in terms of its historic development and attempt to recapture some of the historic field boundaries that would have existed before the golf course was introduced; and
- Similarly, the position of the historic settlement that once existed on the site is an opportunity that should be considered as a guide to locating the existing local centre and movement routes.

3.5 Building heights:

- It would be appropriate, from the perspective of landscape character and views, to propose 2 storey dwellings across the majority of the site, possibly slightly taller in some areas;

- Taller properties (possibly 2.5 or 3 storeys) could potentially exist on lower ground in order to free up space for green infrastructure and visual mitigation in areas to the north of the Site;
- Buildings associated with the local centre could afford greater density and height which could be mitigated using intervening green corridors and the surrounding slightly lower built form;
- Slightly greater building heights could potentially exist comfortably along much of the central spine road if the buildings are orientated to face the road (albeit possibly set back); and

3.6 Reduced density and building heights should be considered to the north and the south-eastern pocket of the Site in order to ensure that visual effects are mitigated from the north and east in particular.

Masterplan proposals

3.7 The recommended opportunities and guidelines contained within this study have been actively included within the current masterplan proposals at this early stage. Once implemented, these aspects of the proposals would provide significant benefits for the Site and wider district, whilst meeting the council's aims in relation to green infrastructure, landscape character and visual amenity, as well as related benefits such as access, movement and connectivity, sustainability, open space and recreation.

3.8 The proposals have incorporated the following key landscape opportunities and guidelines providing the necessary mitigation against landscape and visual effects:

- Generous wooded landscape buffers on Site boundaries will contribute further to the enhancement of local landscape features and fabric, which will provide a positive contribution to the local landscape character of the area and provide the necessary mitigation of visual effects;
- The existing landscape features, e.g. native hedgerows, on the north-eastern Site boundary have been retained in their current arrangement and enhanced with additional and infill planting;
- A connected network of public open space has been provided to allow access by footpath for local residents to outdoor recreational space;

- 'Green fingers' break up the expanse of development across the Site to create a layering of softening effects in relation to views from the north and east in particular;
- Existing waterbodies and associated vegetation on Site, e.g. Hortham Brook, Dockham Ditch and the various water features related to the former golf course, have been mostly retained proving a strong framework for sustainable site drainage and biodiversity;
- Ample provision of outdoor amenity space and facilities has been included within public open space areas for local residents; and
- Historic maps of the area have been used to inform the layout of the masterplan and provided an initial framework for green infrastructure and the layout of new streets and spaces.

4 CONCLUSIONS

4.1 The thorough approach to the preparation of the masterplan, based on an understanding of the Site that has incorporated the combined findings of these studies, has directly informed the design and led to the current proposals.

4.2 Once implemented, these proposals would provide a positive contribution to the landscape character of the Site and surroundings areas and any likely visual effects would be localised and could be reduced over time with appropriate mitigation.

4.3 With a Medium to High Capacity to accommodate change, appropriately designed development, with mitigation, could be accommodated on the Site.

4.4 Development of the Green Belt adjacent to Bristol is considered to be an acceptable proposition for this particular Site.

4.5 Due to the Site's location, as well as its existing landscape and visual characteristics, particularly when compared with other sites, it is considered that the Site would provide a logical and sustainable extension to the city of Bristol.

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS

Landscape Sensitivity and Capacity Study

Woodlands Garden Village, Bristol

[redacted]

December 2016

Landscape Sensitivity and Capacity Study

Woodlands Garden Village, Bristol

[redacted]

December 2016

Prepared by:	Sian Jones
Position:	Senior Chartered Landscape Architect
Qualifications:	Chartered Landscape Architect CMLI, Dip. LA, BA (Hons)
File name:	1878 LSAC 16 12 16.docx
Date issued:	16th December 2016
Checked by:	Alastair Ferrar

CONTENTS

1	**INTRODUCTION AND BACKGROUND TO THE STUDY**	**1**
1.1	Purpose of the Study	1
1.2	The Site	1
1.3	Summary of Methodology	2
2	**REVIEW OF THE WEST OF ENGLAND JOINT SPATIAL PLAN LANDSCAPE SENSITIVITY SUMMARY METHODOLOGY NOTE**	**3**
2.1	Introduction to the West of England Joint Spatial Plan Landscape Sensitivity Summary Methodology Note	3
2.2	LLA Review of the West of England Joint Spatial Plan Landscape Sensitivity Summary Methodology Note	3
2.3	Conclusions to the Review	7
3	**LANDSCAPE BASELINE**	**8**
3.1	LLA's Strategic Landscape and Visual Assessment (SLVA)	8
4	**LANDSCAPE SENSITIVITY AND CAPACITY STUDY FOR THE SITE**	**9**
4.1	Results	9
5	**ASSESSMENT OF ALTERNATIVE SITES IN SOUTH GLOUCESTERSHIRE**	**20**
5.1	Alternative Sites	20
6	**CONCLUSIONS**	**41**

APPENDIX A **Figures 1 - 6 from LLA's Strategic Landscape and Visual Assessment (SLVA), December 2016:**

FIGURE 1: SITE LOCATION

FIGURE 2: AERIAL PHOTOGRAPH

FIGURE 3: PUBLIC RIGHTS OF WAY

FIGURE 4: CULTURAL HERITAGE DESIGNATIONS

FIGURE 5: LANDSCAPE DESIGNATIONS

FIGURE 6: LANDSCAPE CHARACTER AREAS

APPENDIX B **Figure 7 from LLA's Green Belt Review: Sites and Boundaries Study, December 2016:**

FIGURE 7: LOCATION OF ALTERNATIVE SITES IN SOUTH GLOUCESTERSHIRE

1 INTRODUCTION AND BACKGROUND TO THE STUDY

1.1 Purpose of the Study

1.1.1 Liz Lake Associates (LLA) has been commissioned by [redacted] to undertake a Landscape Sensitivity and Capacity Study for a parcel of land (hereafter referred to as 'The Site') in South Gloucestershire, which is being promoted for Green Belt release and subsequent housing development by [redacted] The purpose of the Study is to ensure that the land has been fully considered prior to its promotion for potential residential development.

1.1.2 This study should be read in conjunction with the Strategic Landscape and Visual Assessment (SLVA) and the Green Belt Review: Sites and Boundaries Study for Woodlands Garden Village, Bristol, both carried out by Liz Lake Associates in December 2016. Figures 1-6 of the SLVA, as well as Figure 7 of the Green Belt Review, are of particular relevance to this Landscape Sensitivity and Capacity Study, and are provided in Appendices A and B of this report for ease of reference.

1.2 The Site

1.2.1 The Site occupies an area of approximately 112 ha. Located to the north east of Bristol, it lies directly to the east of the M4-M5 motorway interchange, and adjacent to Bristol's existing urban edge.

1.2.2 The land use on the Site has evolved over time and is now an established golf course, with a very particular landscape character, quality and visual appearance.

1.3 Summary of Methodology

1.3.1 Following a review of the West of England Joint Spatial Plan Landscape Sensitivity Summary Methodology Note, the methodology adopted in this LLA study of Landscape Sensitivity and Capacity is the '*Scottish National Heritage and Countryside Agency's Landscape Character Assessment, Guidance for England and Scotland, 2002'*, together with supporting paper *'Topic Paper 6: Techniques and Criteria for Judging Capacity and Sensitivity'*. This constitutes the industry recognised and accepted methodology.

1.3.2 The site assessment work to inform this Study was undertaken by a Chartered Landscape Architect during late November and early December 2016.

2 REVIEW OF THE WEST OF ENGLAND JOINT SPATIAL PLAN LANDSCAPE SENSITIVITY SUMMARY METHODOLOGY NOTE

2.1 Introduction to the West of England Joint Spatial Plan Landscape Sensitivity Summary Methodology Note

2.1.1 In November 2015 the West of England Partnership, comprising four local authorities (Bath and North East Somerset Council, Bristol City Council, North Somerset Council and South Gloucestershire Council), published a Landscape Sensitivity Summary Methodology Note, as part of the preparation of the Joint Spatial Plan (JSP). The Note is being presented to support the Evidence Base for the JSP Issues and Options.

2.2 LLA Review of the West of England Joint Spatial Plan Landscape Sensitivity Summary Methodology Note

2.2.1 A review of this methodology has been undertaken by LLA, Chartered Landscape Architects, on behalf of [redacted] LLA has over 30 years' experience in landscape architecture and landscape planning. The practice is engaged by Local Authorities across the UK to provide expert landscape planning services for sensitive sites, including land within the Green Belt.

2.2.2 This review is structured in accordance with the structure of the published Methodology Note, as follows:

1. Introduction

2.2.3 The introduction to the Methodology Note (Section 1, paragraph 1.1) states that *"… the West of England Authorities will be drawing on their existing Landscape Character Appraisals… to undertake an assessment of the landscape sensitivity and suitability of currently undeveloped or rural areas to absorb future development."* This suggests that a study with very limited scope will be undertaken, since the process of identifying suitable land would normally

require a far more thorough approach to assessment of the Site and its wider context; furthermore, not all Landscape Character Appraisals include sensitivity studies. The process of identifying suitable land for development requires a more detailed approach, including site specific landscape assessments and the preparation of detailed, site specific, sensitivity and capacity studies, in order to arrive at an informed and robust judgement about the ability or capacity of land to absorb future development and to allow a consistent and transparent comparison of alternative sites.

2.2.4 Other than in paragraph 1.2, the Methodology Note makes no further mention of the integration of landscape character assessments with other types of studies, such as Historic Landscape Character Assessments, in accordance with NPPF requirements (NPPF, para 170). Indeed, in addition to heritage issues, it is essential for a robust assessment to account for all types of environmental influences that may affect the sensitivity of a site and its capacity to absorb development, such as topography, soils, ecology, public access, and so on.

2.2.5 Paragraph 1.3 of the Methodology Note states that "*The high level landscape sensitivity assessment will allow land within the West of England area to be compared against a consistent baseline and methodology*". Whilst a consistent approach is welcome and would enable some form of comparison to be made, the preparation of only a high level study at this stage of the JSP process is not acceptable, since the outcome of such a study will only provide a basic picture of land in general. A high level study will not be detailed enough to identify the true extent of environmental constraints (or opportunities) of a given site. The terminology "*high level*" is ambiguous and confirms an approach that would lack detail and robustness, and therefore the true constraints will not be known.

2. Methodology in Brief

2.2.6 Paragraph 2.1 of the Methodology Note states that best practice guidance and national guidance from the Landscape Institute will be used in the preparation of Landscape and Visual Impact Assessments (LVIAs). Whilst the Guidelines for Landscape and Visual Impact Assessment, Third Addition, 2013, (GLVIA3), are relevant, there is no mention of any other specific guidance that would be

needed to prepare and inform the detail required for a robust assessment. Additional guidance should be included from other relevant sources, including, but not limited to:

- An Approach to Landscape Character Assessment, Natural England, October 2014;
- Landscape Character Assessment, Guidance for England and Scotland, The Countryside Agency, 2002; and
- The Countryside Agency and Scottish National Heritage Landscape Character Assessment Topic Paper 6: Techniques and Criteria for judging Capacity and Sensitivity.

These documents are known to be essential tools in assessing land and applying a robust methodology and approach. Using GLVIA3 alone, as an approach to the study, would not be sufficient to make an assessment of the parcels in the manner described in the Methodology Note.

2.2.7 Paragraph 2.3 states that *"A template will be used to record observations and analysis based on a predominantly desktop study considering the potential for housing-led development"*. A template based on GLVIA3 guidance alone (as mentioned above) will not be sufficient for this purpose. An LVIA is used to assess the potential harm to landscape and visual resources once a layout is emerging or finalised. Firstly, the Council (at this stage) would normally not be sufficiently aware of all development proposals being put forward by any landowner/consortium/promoter and, therefore, would be unable to rely on the LVIA alone with any certainty, as there would be nothing to assess. Secondly, recording observation and analysis in the detail necessary at this stage in the JSP process would require a more detailed and rigorous, site based approach. It is not sufficient or acceptable to use a desk based study, since a desk based study has its limitations and judgements are unable to be made about the quality and condition of the land, its landscape sensitivity to change, the surrounding context, the setting, visual influences, and key views in and out, the potential for visual harm etc. Understanding the potential for housing on a site can only be fully addressed by using field survey techniques and following a

process that allows accurate comparisons between sites, and uses robust methods.

2.2.8 Paragraph 2.4 states that *"Each area will be rated based on this assessment, using a five point scale indicating areas of greatest sensitivity and areas where development would cause least harm"*. For the reasons set out above it is unlikely that a five point scale will accurately bring all the important factors influencing site selection (sensitivity and capacity) together unless a robust methodology is adopted and findings are field based. Without such an assessment, the Councils would not be certain of a robust set of results that are consistent or accurate or reflect the true opportunities and/or constraints of a particular site.

3. Landscape Designations & Policy

2.2.9 Paragraph 3.3 states *"at a local scale, there are a range of distinct landscape areas and valued landscapes which contribute to the special character and quality of life in the West of England area. National Planning Policy states that valued landscapes should be protected and enhanced, in line with their status, and accordingly nationally and internationally designated landscape have the highest level of protection"*. Whilst this is correct and agreed, it should be noted that the assessment process that the Councils undertake should also consider local landscapes, which may not necessarily be designated, but that may still be worthy of protection through a site specific assessment process due to landscape and/or visual qualities that are inherent in preserving the characteristics of the Landscape Character Area (LCA), which may be unique or unusual, or form part of the setting. It would be a concern if the Councils considerations only extended to the merits of designated land for protection. A more thorough approach would therefore be for the Councils to require robust assessments of all land, identifying those which have special character, quality, intactness, value and sensitivity to change, to enable fully considered judgements in relation to land most suited to housing led development. Such assessments should incorporate the findings of a comprehensive range of environmental, cultural and ecological constraints.

2.3 Conclusions to the Review

2.3.1 It is therefore considered that this Landscape Sensitivity and Capacity Study for the Site at Woodlands should follow the recognised and accepted methodology of the '*Scottish National Heritage and Countryside Agency's Landscape Character Assessment, Guidance for England and Scotland, 2002'*; together with the supporting paper *'Topic Paper 6: Techniques and Criteria for Judging Capacity and Sensitivity'.*

3 LANDSCAPE BASELINE

3.1 LLA's Strategic Landscape and Visual Assessment (SLVA)

3.1.1 Reference should be made to Section 3 'Existing Situation of the Strategic Landscape and Visual Assessment (SLVA) by LLA, December 2016, for a comprehensive review of the landscape resource and visual amenity of the Site. This study includes a summary of the Site's context, as well as of landscape-related planning policy, published landscape character data and relevant information relating to landscape designations and sensitive views.

4 LANDSCAPE SENSITIVITY AND CAPACITY STUDY FOR THE SITE

4.1 Results

4.1.1 The results of the Landscape Sensitivity and Capacity Study for the Site are presented in the below completed Field Record Sheets and evaluation Matrices, which constitute a comprehensive record of the assessment and outcome.

Field Record Sheet #1:

Date: 09/12 /2016		Broad Location: Woodlands			
Time: 10:15					
Surveyed by: SS/SJ					
Landscape Sensitivity					
Ecological					
Vegetation Type		*Grassland*	*Scrub*	*Woodland*	*Wetland*
Tree Cover		*Low/limited*	*Sparse*	*Small Woodland*	*Large Woodland*
Tree Age		*New*	*Young*	*Established*	*Mature*
Extent and Pattern of Semi Natural Habitat		*Fragmented*	*Scattered*	*Widespread*	*Extensive*
Land Use		*Arable*	*Improved Grassland*	*Unimproved Grassland*	*Set Aside*
Cultural					
Land Use		*Urban*	*Arable*	*Grazing*	*Fallow*
Historic Landscape		*New landscape / no evidence of historic landscape*	*Significant change*	*Interrupted*	*Ancient*
Field Boundaries		*Varied*		*Uniform*	
Field Size / Pattern		*Large Regular*	*Small Regular*	*Large Irregular*	*Small Irregular*
Intactness		*Broken*	*Disjointed*	*Grouped*	*Uniform*
Character		*Urban*	*Urban Fringe*	*Managed Countryside*	*Fallow Countryside*
Enclosure Pattern		*Contained*	*Semi-contained*		*Open*
Visual					
Tree / Woodland Cover		*Low/limited*	*Sparse*	*Small Woodland*	*Large Woodland*
Form / Line		*Flat*	*Gently Undulating*	*Rolling / Undulating*	*Sloping*
Landmark Influences		*No landmark*	*Interrupted Landmark*	*Man-made Landmark*	*Natural Landmark*
Levels of Openness (photos and views in / out of the area)		*Limited / No view*	*Adjacent area (e.g. field)*	*Medium distance*	*Long distance*
Number of People	Residents	*<5*	*5-25*	*26-50*	*>50*
	Visitors	*<5*	*5-25*	*26-50*	*>50*
Scope for Mitigation		*No*			*Yes*
Landscape Value					
Tranquility			*Low*	*Moderate*	*High*
Cultural Associations			*Low*	*Moderate*	*High*
Conservation Interests			*Low*	*Moderate*	*High*

*** Results in Yellow**

Landscape Sensitivity Matrices:

- **Ecological Sensitivity**

0	1	2	3	4
Very Low	Low	Medium	High	Very High

Sensitivity to Change

Tree Cover	Grassland	Scrub	Woodland	Wetland
Large Wood	3	3	4	4
Small Wood	2	3	3	4
Sparse	1	2	2	3
Low/Limited	0	1	2	3

Vegetation Type

Tree Cover	New	Young	Established	Mature
Large Wood	3	3	4	4
Small Wood	2	3	3	4
Sparse	1	2	2	3
Low/Limited	0	1	2	3

Tree Age

Size	Extent and Pattern of Semi-Natural Habitat			
Large (>50ha)	2	3	3	4
Medium (25 – 50 ha)	1	2	3	3
Small (<25ha)	0	1	2	3
	Fragmented	Scattered	Widespread	Extensive

Historic Landscape	Vegetation Type			
Ancient	3	3	4	4
Interrupted	2	2	3	4
Significant Change	1	2	2	3
No Evidence	0	1	2	3
	Grassland	Scrub	Woodland	Wetland

Size	Arable	Improved Grassland	Unimproved Grassland	Set Aside
Large (>50ha)	2	3	3	4
Medium (25 – 50 ha)	1	2	3	3
Small (<25ha)	0	1	2	3

Land Use

Total Ecological Score (out of 20):	**9**

- **Cultural Sensitivity**

0	1	2	3	4
Very Low	Low	Medium	High	Very High

Sensitivity to Change

Historic Landscape	Urban	Arable	Grazing	Fallow
Ancient	4	4	4	4
Interrupted	2	3	3	4
Significant Change	1	2	2	3
No Evidence	0	1	2	3

Land Use

Field Size / Pattern	Varied	Uniform
Small Irregular	4	4
Large Irregular	3	4
Small Regular	2	3
Large Regular	**1**	2

Field Boundaries

Character	Broken	Disjointed	Grouped	Uniform
Fallow Countryside	3	3	4	4
Managed Countryside	2	3	3	4
Urban Fringe	1	2	2	3
Urban	0	1	2	3

Intactness

Size	Contained	Semi-contained	Open
Large (>50ha)	2	3	4
Medium (25 – 50 ha)	1	2	3
Small (<25ha)	0	1	2

Enclosure Pattern

Total Cultural Score (out of 16):	**8**

- **Visual Sensitivity**

0	1	2	3	4
Very Low	Low	Medium	High	Very High

Sensitivity to Change

Tree Cover	Large Wood	3	3	4	4
	Small Wood	2	3	3	4
	Sparse	1	1	2	3
	Low/Limited	0	1	2	3
		Flat	Gently	Rolling / Undulating	Sloping

Undulating Area Form

Levels of Openness	Long Distance	**2**	3	4	4
	Medium Distance	2	2	3	4
	Adjacent Area	1	2	2	3
	Limited / No View	0	1	2	2
		No landmark	Interrupted Landmark	Man-made Landmark	Natural Landmark

Area Form Influences

Number of People (Residents)

<25	26-50	51-75	>75
1	2	3	4

Number of People (Visitors)

<25	26-50	51-75	>75
1	**2**	3	4

Scope for Mitigation

Yes	No
1	4

Total Visual Score (out of 20):	**8**
Total Landscape Sensitivity Score (out of 56):	25

Total Landscape Sensitivity Scopre			
0 – 14	15 – 28	29 – 43	44 – 56
Low	Medium	High	Very High

Landscape Value Matrices:

European / Local Environmental Designations

None	Within 50m	Adjacent	Partial	Whole
0	1	2	3	4

Landscape Value Criteria - Yes = 1; No = 0:

Criteria	**Score**					
Tranquility	Low	0	Moderate	1	High	2
Cultural Associations	Low	0	Moderate	1	High	2
Conservation Interests	Low	0	Moderate	1	High	2

Scarcity of Landscape

Common	Frequent	Unusual	Unique
1	2	3	4

Agricultural Land

Urban	Non Agricultural	Grade 4	Grade 3	Grade 2
0	1	2	3	4

Total Landscape Value Score (out of 18):	4

Total Landscape Value			
0 – 4	5 – 9	10 – 14	15 – 18
Low	Medium	High	Very High

Landscape Capacity Matrix:

Landscape Sensitivity					
	Very High	Low	Very Low	Very Low	Very Low
	High	Medium	Low	Low	Very Low
	Medium	Medium to High	Medium	Low	Very Low
	Low	High	Medium to High	Medium	Low
		Low	Medium	High	Very High
			Landscape Value		

Very Low Capacity within the Landscape – development is likely to be precluded by the high sensitivity and / or value of the landscape.
Low Capacity within the Landscape – development is likely to have an adverse effect on the quality and value of the landscape.
Medium Capacity within the Landscape – mitigation would be required to offset or balance any negative effects that development would have on the quality and value of the landscape.
Medium to High Capacity within the Landscape – appropriately designed development could be accommodated within the landscape. Some mitigation required.
High Capacity within the Landscape – development is likely to have no overall (net) adverse effects on the quality or value of the landscape. Some mitigation may still be required.

Summary Results:
The final Landscape Capacity matrix is derived by combining the Landscape Value with Landscape Sensitivity, which are in this Low and Medium respectively. When combined, the scores result in an outcome that shows that the Site has a Medium to High Capacity to accommodate change. As noted above, this means that appropriately designed development could be accommodated within the landscape, with some mitigation required.

Note: As a general rule when evaluating landscape capacity it should be noted that sites with a higher sensitivity generally have a lower capacity to absorb or accommodate change. Conversely sites with a lower sensitivity have a higher capacity to absorb or accommodate those changes.

5 ASSESSMENT OF ALTERNATIVE SITES IN SOUTH GLOUCESTERSHIRE

5.1 Alternative Sites

5.1.1 Alternative (competing) sites within South Gloucestershire were reviewed as part of this study, as follows:

- Land at Buckover; and
- Land at Charfield.

5.1.2 The completed Field Record Sheets and evaluation Matrices for these alternative sites are provided below:

Field Record Sheet #1:

Date: 09/12 /2016	Broad Location: Buckover			
Time: 13:35				
Surveyed by: SS/SJ				
Landscape Sensitivity				
Ecological				
Vegetation Type	*Grassland*	*Scrub*	*Woodland*	*Wetland*
Tree Cover	*Low/limited*	*Sparse*	*Small Woodland*	*Large Woodland*
Tree Age	*New*	*Young*	*Established*	*Mature*
Extent and Pattern of Semi Natural Habitat	*Fragmented*	*Scattered*	*Widespread*	*Extensive*
Land Use	*Arable*	*Improved Grassland*	*Unimproved Grassland*	*Set Aside*
Cultural				
Land Use	*Urban*	*Arable*	*Grazing*	*Fallow*
Historic Landscape	*New landscape / no evidence of historic landscape*	*Significant change*	*Interrupted*	*Ancient*
Field Boundaries	*Varied*		*Uniform*	
Field Size / Pattern	*Large Regular*	*Small Regular*	*Large Irregular*	*Small Irregular*
Intactness	*Broken*	*Disjointed*	*Grouped*	*Uniform*
Character	*Urban*	*Urban Fringe*	*Managed Countryside*	*Fallow Countryside*
Enclosure Pattern	*Contained*	*Semi-contained*		*Open*
Visual				
Tree / Woodland Cover	*Low/limited*	*Sparse*	*Small Woodland*	*Large Woodland*
Form / Line	*Flat*	*Gently Undulating*	*Rolling / Undulating*	*Sloping*
Landmark Influences	*No landmark*	*Interrupted Landmark*	*Man-made Landmark*	*Natural Landmark*
Levels of Openness (photos and views in / out of the area)	*Limited / No view*	*Adjacent area (e.g. field)*	*Medium distance*	*Long distance*
Number of People — Residents	*<5*	*5-25*	*26-50*	*>50*
Number of People — Visitors	*<5*	*5-25*	*26-50*	*>50*
Scope for Mitigation	*No*			*Yes*
Landscape Value				
Tranquility		*Low*	*Moderate*	*High*
Cultural Associations		*Low*	*Moderate*	*High*
Conservation Interests		*Low*	*Moderate*	*High*

*** Results in Yellow**

Landscape Sensitivity Matrices:

- **Ecological Sensitivity**

0	1	2	3	4
Very Low	Low	Medium	High	Very High

Sensitivity to Change

Tree Cover	Grassland	Scrub	Woodland	Wetland
Large Wood	3	3	4	4
Small Wood	2	3	3	4
Sparse	1	2	2	3
Low/Limited	0	1	2	3

Vegetation Type

Tree Cover	New	Young	Established	Mature
Large Wood	3	3	4	4
Small Wood	2	3	3	4
Sparse	1	2	2	3
Low/Limited	**0**	1	2	3

Tree Age

Size					
	Large (>50ha)	2	3	3	4
	Medium (25 – 50 ha)	1	2	3	3
	Small (<25ha)	0	1	2	3
		Fragmented	Scattered	Widespread	Extensive

Extent and Pattern of Semi-Natural Habitat

Historic Landscape					
	Ancient	3	3	4	4
	Interrupted	2	2	3	4
	Significant Change	1	2	2	3
	No Evidence	0	1	2	3
		Grassland	Scrub	Woodland	Wetland

Vegetation Type

Size	Arable	Improved Grassland	Unimproved Grassland	Set Aside
Large (>50ha)	2	3	3	4
Medium (25 – 50 ha)	1	2	3	3
Small (<25ha)	0	1	2	3

Land Use

Total Ecological Score (out of 20):	**11**

- **Cultural Sensitivity**

0	1	2	3	4
Very Low	Low	Medium	High	Very High

Sensitivity to Change

Historic Landscape	Urban	Arable	Grazing	Fallow
Ancient	4	4	4	4
Interrupted	2	3	3	4
Significant Change	1	2	2	3
No Evidence	0	1	2	3

Land Use

Field Size / Pattern	Varied	Uniform
Small Irregular	4	4
Large Irregular	3	4
Small Regular	2	3
Large Regular	**1**	2

Field Boundaries

Character	Broken	Disjointed	Grouped	Uniform
Fallow Countryside	3	3	4	4
Managed Countryside	2	3	3	4
Urban Fringe	1	2	2	3
Urban	0	1	2	3

Intactness

Size	Contained	Semi-contained	Open
Large (>50ha)	2	3	4
Medium (25 – 50 ha)	1	2	3
Small (<25ha)	0	1	2

Enclosure Pattern

Total Cultural Score (out of 16):	**15**

- **Visual Sensitivity**

0	1	2	3	4
Very Low	Low	Medium	High	Very High

Sensitivity to Change

Tree Cover	Large Wood	3	3	4	4
	Small Wood	2	3	3	4
	Sparse	1	1	2	3
	Low/Limited	0	1	2	3
		Flat	Gently	Rolling / Undulating	Slopin

Undulating Area Form

Levels of Openness	Long Distance	**2**	3	4	4
	Medium Distance	2	2	3	4
	Adjacent Area	1	2	2	3
	Limited / No View	0	1	2	2
		No landmark	Interrupted Landmark	Man-made Landmark	Natural Landmark

Area Form Influences

Number of People (Residents)

<25	26-50	51-75	>75
1	2	3	4

Number of People (Visitors)

<25	26-50	51-75	>75
1	2	3	4

Scope for Mitigation

Yes	No
1	4

Total Visual Score (out of 20):	**9**
Total Landscape Sensitivity Score (out of 56):	35

Total Landscape Sensitivity Scopre			
0 – 14	15 – 28	29 – 43	44 – 56
Low	Medium	High	Very High

Landscape Value Matrices:

European / Local Environmental Designations

None	Within 50m	Adjacent	Partial	Whole
0	1	2	3	4

Landscape Value Criteria - Yes = 1; No = 0:

Criteria	**Score**					
Tranquility	Low	0	Moderate	1	High	2
Cultural Associations	Low	0	Moderate	1	High	2
Conservation Interests	Low	0	Moderate	1	High	2

Scarcity of Landscape

Common	Frequent	Unusual	Unique
1	2	3	4

Agricultural Land

Urban	Non Agricultural	Grade 4	Grade 3	Grade 2
0	1	2	3	4

Total Landscape Value Score (out of 18):	11

Total Landscape Value			
0 – 4	5 – 9	10 – 14	15 – 18
Low	Medium	High	Very High

Landscape Capacity Matrix:

Landscape Sensitivity					
	Very High	Low	Very Low	Very Low	Very Low
	High	Medium	Low	Low	Very Low
	Medium	Medium to High	Medium	Low	Very Low
	Low	High	Medium to High	Medium	Low
		Low	Medium	High	Very High
			Landscape Value		

Very Low Capacity within the Landscape – development is likely to be precluded by the high sensitivity and / or value of the landscape.
Low Capacity within the Landscape – development is likely to have an adverse effect on the quality and value of the landscape.
Medium Capacity within the Landscape – mitigation would be required to offset or balance any negative effects that development would have on the quality and value of the landscape.
Medium to High Capacity within the Landscape – appropriately designed development could be accommodated within the landscape. Some mitigation required.
High Capacity within the Landscape – development is likely to have no overall (net) adverse effects on the quality or value of the landscape. Some mitigation may still be required.

Summary Results:
The final Landscape Capacity matrix is derived by combining the Landscape Value with Landscape Sensitivity, which are in this case both High. When combined, the scores result in an outcome that shows that the Site has a Low Capacity to accommodate change. As noted above, this means that development is likely to have an adverse effect on the quality and value of the landscape.

Note: As a general rule when evaluating landscape capacity it should be noted that sites with a higher sensitivity generally have a lower capacity to absorb or accommodate change. Conversely sites with a lower sensitivity have a higher capacity to absorb or accommodate those changes.

Field Record Sheet #1:

Date: 09/12 /2016		Broad Location: Charfield			
Time: 15:15					
Surveyed by: SS/SJ					
Landscape Sensitivity					
Ecological					
Vegetation Type		*Grassland*	*Scrub*	*Woodland*	*Wetland*
Tree Cover		*Low/limited*	*Sparse*	*Small Woodland*	*Large Woodland*
Tree Age		*New*	*Young*	*Established*	*Mature*
Extent and Pattern of Semi Natural Habitat		*Fragmented*	*Scattered*	*Widespread*	*Extensive*
Land Use		*Arable*	*Improved Grassland*	*Unimproved Grassland*	*Set Aside*
Cultural					
Land Use		*Urban*	*Arable*	*Grazing*	*Fallow*
Historic Landscape		*New landscape / no evidence of historic landscape*	*Significant change*	*Interrupted*	*Ancient*
Field Boundaries		*Varied*		*Uniform*	
Field Size / Pattern		*Large Regular*	*Small Regular*	*Large Irregular*	*Small Irregular*
Intactness		*Broken*	*Disjointed*	*Grouped*	*Uniform*
Character		*Urban*	*Urban Fringe*	*Managed Countryside*	*Fallow Countryside*
Enclosure Pattern		*Contained*	*Semi-contained*		*Open*
Visual					
Tree / Woodland Cover		*Low/limited*	*Sparse*	*Small Woodland*	*Large Woodland*
Form / Line		*Flat*	*Gently Undulating*	*Rolling / Undulating*	*Sloping*
Landmark Influences		*No landmark*	*Interrupted Landmark*	*Man-made Landmark*	*Natural Landmark*
Levels of Openness (photos and views in / out of the area)		*Limited / No view*	*Adjacent area (e.g. field)*	*Medium distance*	*Long distance*
Number of People	Residents	*<5*	*5-25*	*26-50*	*>50*
	Visitors	*<5*	*5-25*	*26-50*	*>50*
Scope for Mitigation		*No*			*Yes*
Landscape Value					
Tranquility			*Low*	*Moderate*	*High*
Cultural Associations			*Low*	*Moderate*	*High*
Conservation Interests			*Low*	*Moderate*	*High*

*** Results in Yellow**

Landscape Sensitivity Matrices:

- **Ecological Sensitivity**

0	1	2	3	4
Very Low	Low	Medium	High	Very High

Sensitivity to Change

Tree Cover	Grassland	Scrub	Woodland	Wetland
Large Wood	3	3	4	4
Small Wood	2	3	3	4
Sparse	1	2	2	3
Low/Limited	0	1	2	3

Vegetation Type

Tree Cover	New	Young	Established	Mature
Large Wood	3	3	4	4
Small Wood	2	3	3	4
Sparse	1	2	2	3
Low/Limited	**0**	1	2	3

Tree Age

Size	Extent and Pattern of Semi-Natural Habitat			
Large (>50ha)	2	3	3	4
Medium (25 – 50 ha)	1	2	3	3
Small (<25ha)	0	1	2	3
	Fragmented	Scattered	Widespread	Extensive

Historic Landscape	Vegetation Type			
Ancient	3	3	4	4
Interrupted	2	2	3	4
Significant Change	1	2	2	3
No Evidence	0	1	2	3
	Grassland	Scrub	Woodland	Wetland

Size	Arable	Improved Grassland	Unimproved Grassland	Set Aside
Large (>50ha)	2	3	3	4
Medium (25 – 50 ha)	1	2	3	3
Small (<25ha)	0	1	2	3

Land Use

Total Ecological Score (out of 20):	**11**

- **Cultural Sensitivity**

0	1	2	3	4
Very Low	Low	Medium	High	Very High

Sensitivity to Change

Historic Landscape	Urban	Arable	Grazing	Fallow
Ancient	4	4	4	4
Interrupted	2	3	3	4
Significant Change	1	2	2	3
No Evidence	0	1	2	3

Land Use

Field Size / Pattern	Varied	Uniform
Small Irregular	4	4
Large Irregular	3	4
Small Regular	2	3
Large Regular	1	2

Field Boundaries

Character	Broken	Disjointed	Grouped	Uniform
Fallow Countryside	3	3	4	4
Managed Countryside	2	3	3	4
Urban Fringe	1	2	2	3
Urban	0	1	2	3

Intactness

Size	Contained	Semi-contained	Open
Large (>50ha)	2	3	4
Medium (25 – 50 ha)	1	2	3
Small (<25ha)	0	1	2

Enclosure Pattern

Total Cultural Score (out of 16):	**12**

- **Visual Sensitivity**

0	1	2	3	4
Very Low	Low	Medium	High	Very High

Sensitivity to Change

Tree Cover	Flat	Gently	Rolling / Undulating	Sloping
Large Wood	3	3	4	4
Small Wood	2	3	3	4
Sparse	1	1	2	3
Low/Limited	0	1	2	3

Undulating Area Form

Levels of Openness	No landmark	Interrupted Landmark	Man-made Landmark	Natural Landmark
Long Distance	2	3	4	4
Medium Distance	2	2	3	4
Adjacent Area	1	2	2	3
Limited / No View	0	1	2	2

Area Form Influences

Number of People (Residents)

<25	26-50	51-75	>75
1	2	3	4

Number of People (Visitors)

<25	26-50	51-75	>75
1	2	3	4

Scope for Mitigation

Yes	No
1	4

Total Visual Score (out of 20):	**8**
Total Landscape Sensitivity Score (out of 56):	31

Total Landscape Sensitivity Scopre			
0 – 14	15 – 28	29 – 43	44 – 56
Low	Medium	High	Very High

Landscape Value Matrices:

European / Local Environmental Designations

None	Within 50m	Adjacent	Partial	Whole
0	1	2	3	4

Landscape Value Criteria - Yes = 1; No = 0:

Criteria	**Score**					
Tranquility	Low	0	Moderate	1	High	2
Cultural Associations	Low	0	Moderate	1	High	2
Conservation Interests	Low	0	Moderate	1	High	2

Scarcity of Landscape

Common	Frequent	Unusual	Unique
1	2	3	4

Agricultural Land

Urban	Non Agricultural	Grade 4	Grade 3	Grade 2
0	1	2	3	4

Total Landscape Value Score (out of 18):	6

Total Landscape Value			
0 – 4	5 – 9	10 – 14	15 – 18
Low	Medium	High	Very High

Landscape Capacity Matrix:

Landscape Sensitivity					
	Very High	Low	Very Low	Very Low	Very Low
	High	Medium	Low	Low	Very Low
	Medium	Medium to High	Medium	Low	Very Low
	Low	High	Medium to High	Medium	Low
		Low	Medium	High	Very High
			Landscape Value		

Very Low Capacity within the Landscape – development is likely to be precluded by the high sensitivity and / or value of the landscape.
Low Capacity within the Landscape – development is likely to have an adverse effect on the quality and value of the landscape.
Medium Capacity within the Landscape – mitigation would be required to offset or balance any negative effects that development would have on the quality and value of the landscape.
Medium to High Capacity within the Landscape – appropriately designed development could be accommodated within the landscape. Some mitigation required.
High Capacity within the Landscape – development is likely to have no overall (net) adverse effects on the quality or value of the landscape. Some mitigation may still be required.

Summary Results:
The final Landscape Capacity matrix is derived by combining the Landscape Value with Landscape Sensitivity, which are in this case Medium and High respectively. When combined, the scores result in an outcome that shows that the Site has a Low Capacity to accommodate change. As noted above, this means that development is likely to have an adverse effect on the quality and value of the landscape.

Note: As a general rule when evaluating landscape capacity it should be noted that sites with a higher sensitivity generally have a lower capacity to absorb or accommodate change. Conversely sites with a lower sensitivity have a higher capacity to absorb or accommodate those changes.

6 CONCLUSIONS

6.1.1 This Landscape Sensitivity and Capacity Study has found that the Site at Woodlands has a Medium to High Capacity to accommodate change. This means that appropriately designed development could be accommodated within the landscape, with some mitigation required.

6.1.2 The alternative sites of Buckover and Charfield have both been assessed having Low Capacity to accommodate change. This means that development is likely to have an adverse effect on the quality and value of these landscapes.

Stansted:
Unit 1, The Exchange,
9 Station Road, Stansted, CM24 8BE

t +44 (0)1279 647044
e office@lizlake.com
www.lizlake.com

Bristol:
1 Host Street,
Bristol, BS1 5BU

t +44 (0)117 927 1786

Nottingham:
Sutton Place, 49 Stoney St,
Nottingham NG1 1LX

t +44 (0)115 784 3566

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS

- Landscape Design
- Urban Design
- Residential
- Public Realm
- Masterplanning
- Landscape Planning
- Heritage Landscapes
- Gardens and Estates
- Restoration and Conversion
- Places of Worship
- Expert Witness
- Hospitality
- Education
- Retail / Office
- Community
- Ecology
- Arboriculture
- 3D / Graphic Design

Appendix A

WOODLANDS GARDEN VILLAGE, BRISTOL

LANDSCAPE SENSITIVITY AND CAPACITY STUDY

FIGURES 1 - 6

December 2016

Figures 1 - 6 from LLA's Strategic Landscape and Visual Assessment (SLVA), December 2016:

FIGURE 1: SITE LOCATION

FIGURE 2: AERIAL PHOTOGRAPH

FIGURE 3: PUBLIC RIGHTS OF WAY

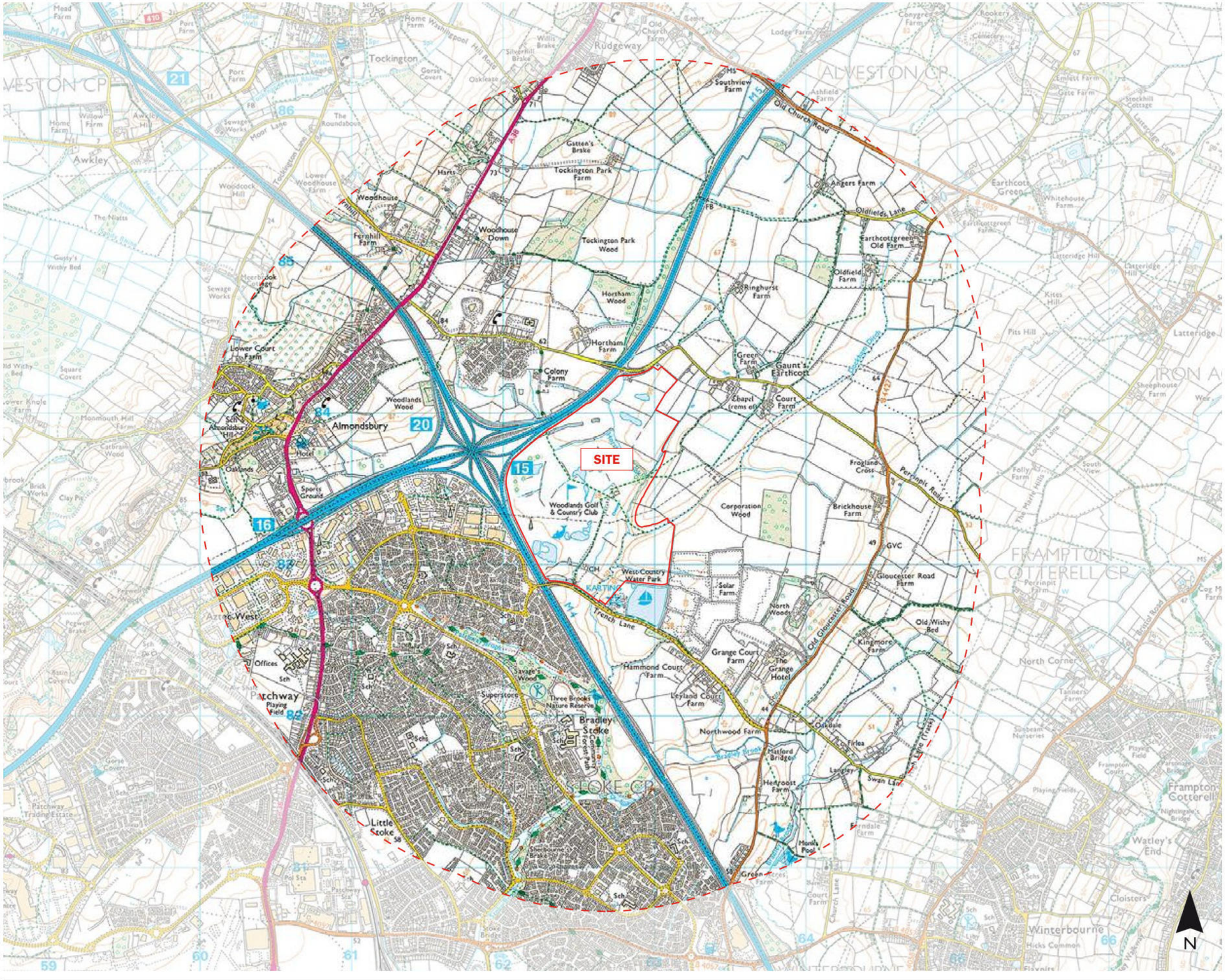
FIGURE 4: CULTURAL HERITAGE DESIGNATIONS

FIGURE 5: LANDSCAPE DESIGNATIONS

FIGURE 6: LANDSCAPE CHARACTER AREAS

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS
office@lizlake.com www.lizlake.com

Figure 1
Site Location



Legend

Site boundary

2km extent of study area

Project: Woodlands Golf Course, Bristol

Client: [redacted]

Date: December 2016

Scale: 1:25,000 @ A3

Status: Planning

© COPYRIGHT LIZ LAKE ASSOCIATES Reproduced from Ordnance Survey map data by permission of Ordnance Survey © Crown copyright 2016 Licence No.100007196
© Crown copyright and database rights 2016 Ordnance Survey Licence No.0100031673

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS
office@lizlake.com www.lizlake.com

Figure 2
Aerial Photograph



Legend

Site boundary

Project: Woodlands Golf Course, Bristol

Client: [redacted]

Date: December 2016

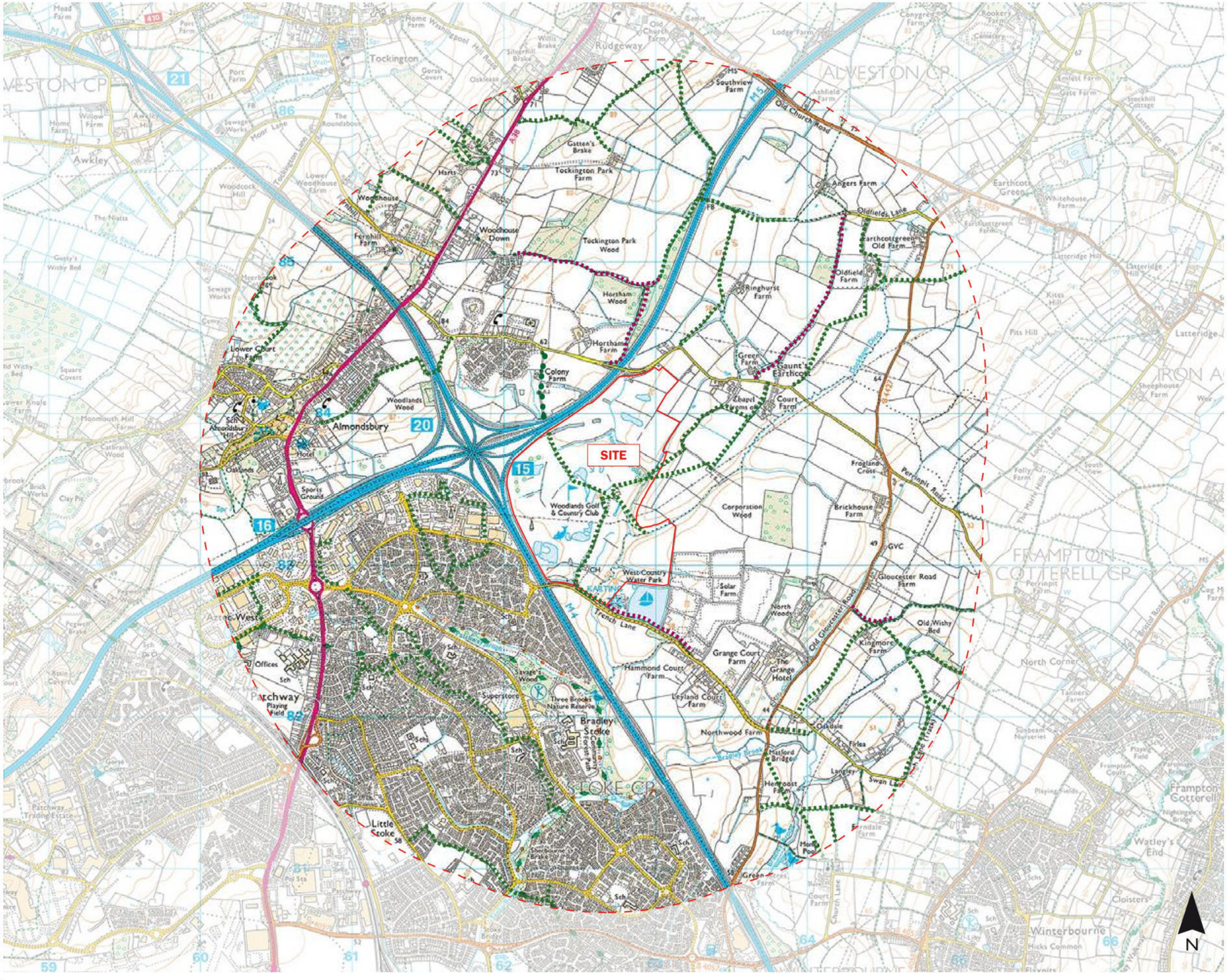
Scale: 1:25,000 @ A3

Status: Planning

© COPYRIGHT LIZ LAKE ASSOCIATES Reproduced from Ordnance Survey map data by permission of Ordnance Survey © Crown copyright 2016 Licence No.100007196
© Crown copyright and database rights 2016 Ordnance Survey Licence No.0100031673

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS
office@lizlake.com www.lizlake.com

Figure 3
Public Rights of Way



Legend

- Site boundary
- 2km extent of study area

Public Rights of Way:

- Public footpath
- Public bridleway
- Other route with public access

Project: Woodlands Golf Course, Bristol

Client: [redacted]

Date: December 2016

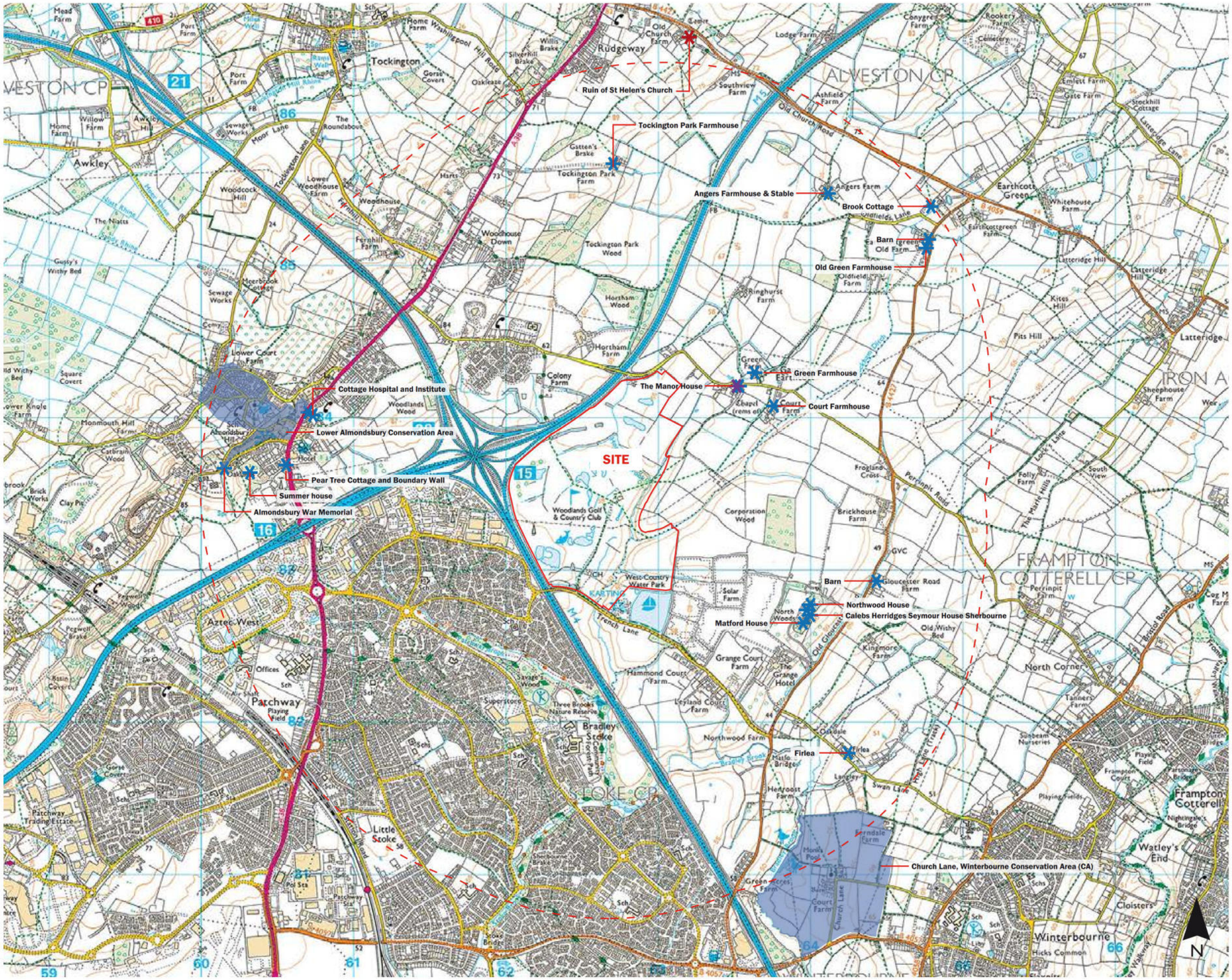
Scale: 1:25,000 @ A3

Status: Planning

© COPYRIGHT LIZ LAKE ASSOCIATES Reproduced from Ordnance Survey map data by permission of Ordnance Survey © Crown copyright 2016 Licence No.100007196
© Crown copyright and database rights 2016 Ordnance Survey Licence No.0100031673

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS
office@lizlake.com www.lizlake.com

Figure 4
Cultural Heritage Designations



Legend

- Site boundary
- 2km extent of study area
- Conservation Area (CA)
- Grade II* Listed Building outside Conservation Area (Total 1)
- Grade II Listed Building outside Conservation Area (Total 12)
- Scheduled Monument

Listed Buidlings within Lower Almondsbury Conservation Area:

Grade I	1
Grade II	16

Listed Buidlings within Church Lane, Winterbourne Conservation Area:

Grade I	1
Grade II*	1
Grade II	5

Project: Woodlands Golf Course, Bristol

Client: [redacted]

Date: December 2016

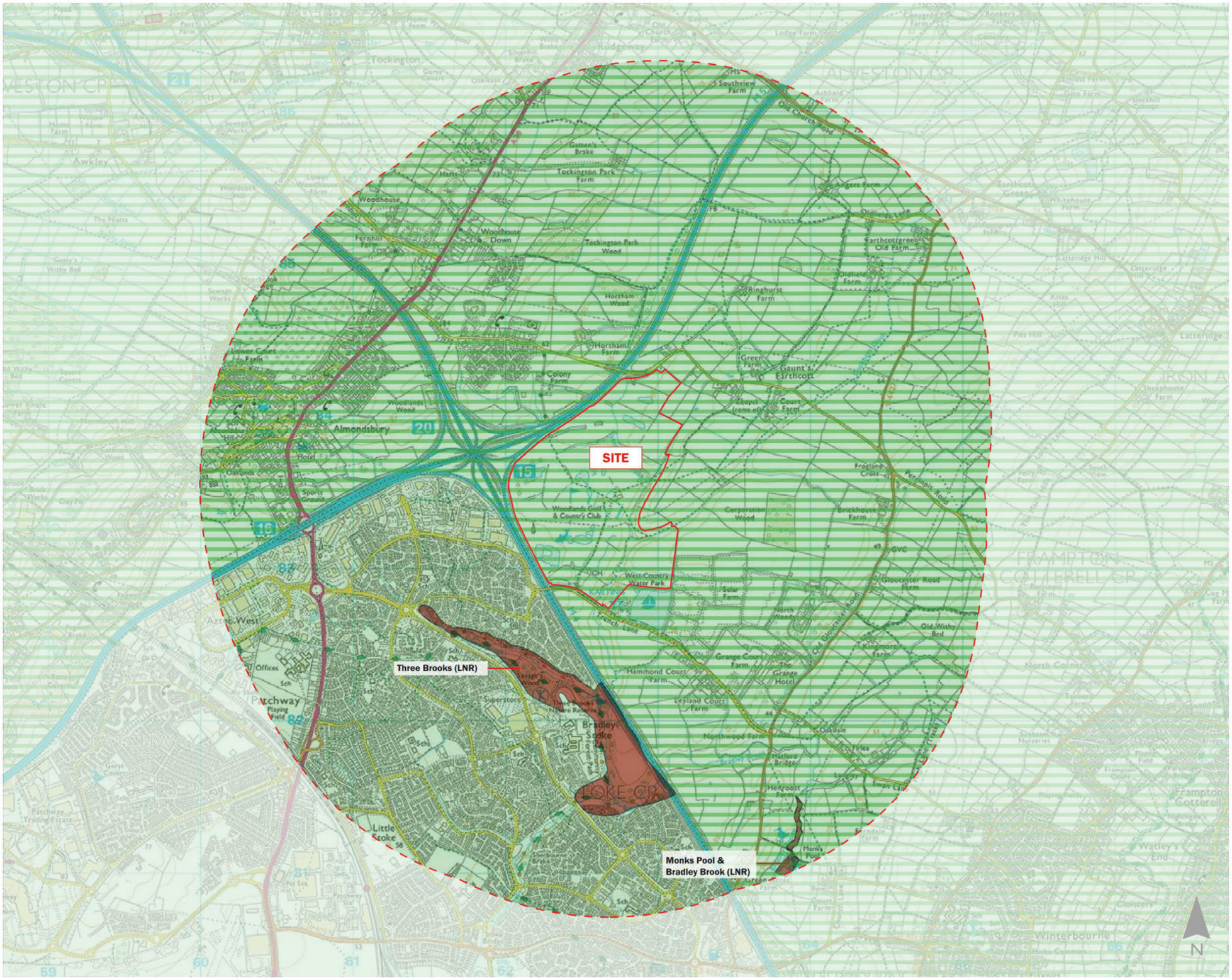
Scale: 1:25,000 @ A3

Status: Planning

© COPYRIGHT LIZ LAKE ASSOCIATES Reproduced from Ordnance Survey map data by permission of Ordnance Survey © Crown copyright 2016 Licence No.100007196
© Crown copyright and database rights 2016 Ordnance Survey Licence No.0100031673

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS
office@lizlake.com www.lizlake.com

Figure 5
Landscape Designations



Legend

- Site boundary
- 2km extent of study area
- Local Nature Reserve (LNR)
- Bristol Greenbelt
- Avon Community Forest

Project: Woodlands Golf Course, Bristol

Client: [redacted]

Date: December 2016

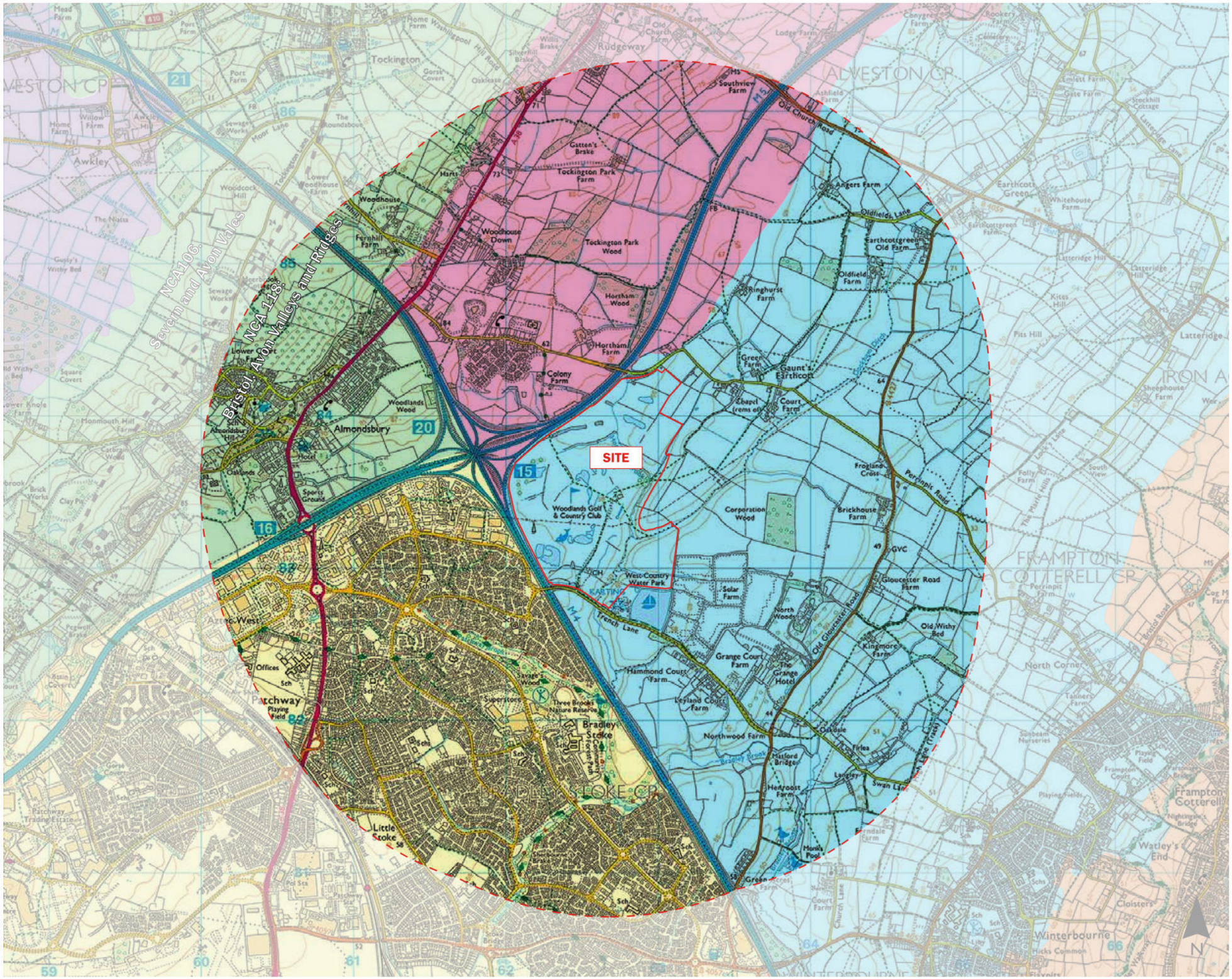
Scale: 1:25,000 @ A3

Status: Planning

© COPYRIGHT LIZ LAKE ASSOCIATES Reproduced from Ordnance Survey map data by permission of Ordnance Survey © Crown copyright 2016 Licence No.100007196
© Crown copyright and database rights 2016 Ordnance Survey Licence No.0100031673

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS
office@lizlake.com www.lizlake.com

Figure 6
Landscape Character Areas



Legend

Site boundary

2 km extent of study area

South Gloucestershire Landscape Character Assessment (2013) Landscape Character Areas:

Severn Ridges (18)

Patchway & Filton (15)

Earthcott Vale (10)

Rudgeway & Tytherington Ridge (17)

Project: Woodlands Golf Course, Bristol

Client: [redacted]

Date: December 2016

Scale: 1:25,000 @ A3

Status: Planning

© COPYRIGHT LIZ LAKE ASSOCIATES Reproduced from Ordnance Survey map data by permission of Ordnance Survey © Crown copyright 2016 Licence No.100007196
© Crown copyright and database rights 2016 Ordnance Survey Licence No.0100031673

Appendix B

WOODLANDS GARDEN VILLAGE, BRISTOL

LANDSCAPE SENSITIVITY AND CAPACITY STUDY

FIGURE 7

December 2016

Figure 7 from LLA's Green Belt Review: Sites and Boundaries Study, December 2016:

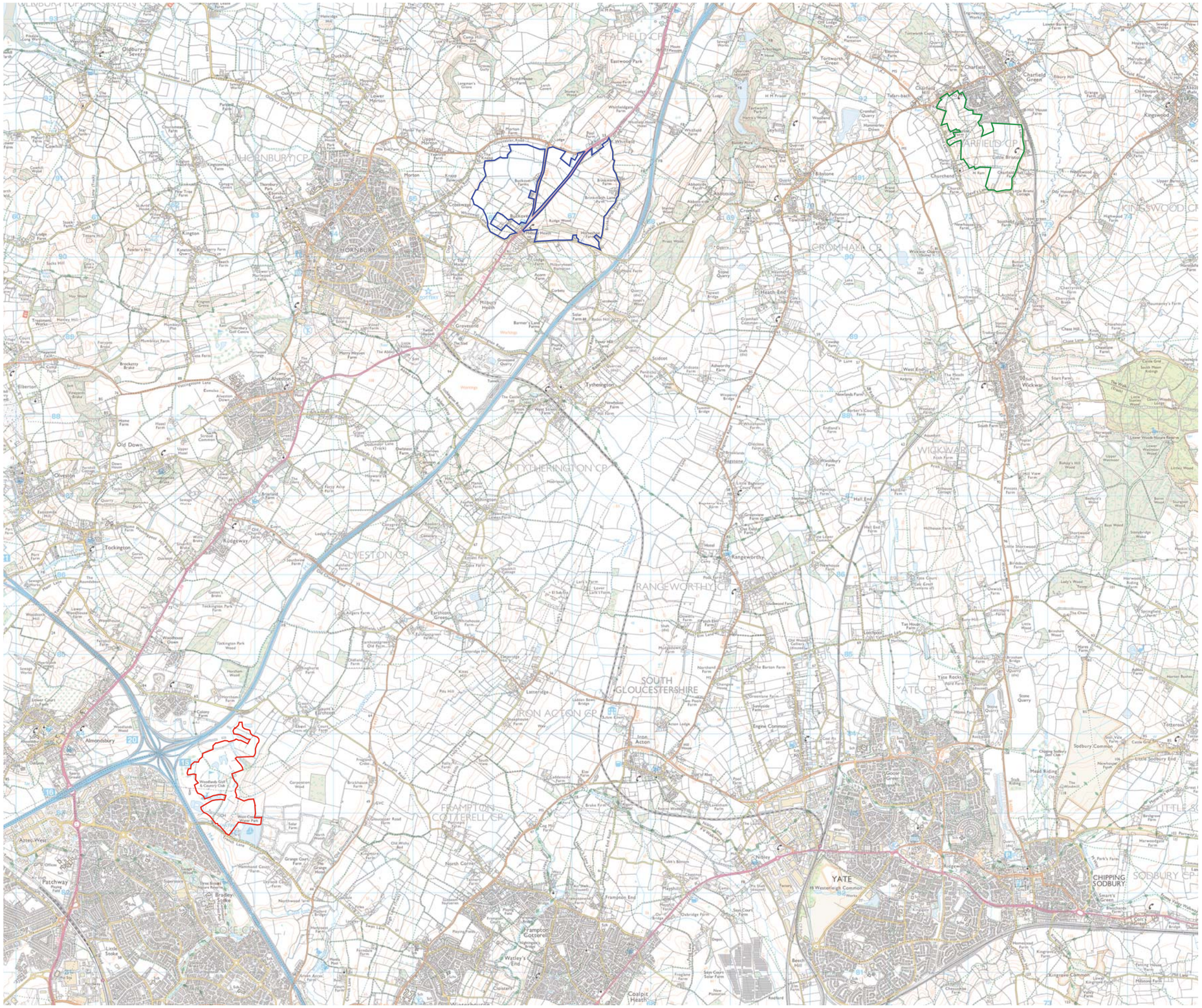
FIGURE 7: LOCATION OF ALTERNATIVE SITES IN SOUTH GLOUCESTERSHIRE

LIZ LAKE ASSOCIATES
LANDSCAPE ARCHITECTS

www.lizlake.com

1878 Figure 7

Location of Alternative Sites in South Gloucestershire



Legend

- The Site
- Buckover Garden Village
- South and West Charfield

Project: Woodlands Garden Village, Bristol

Client: [redacted]

Date: December 2016

Scale: 1:50,000 @ A3

Status: Planning

© COPYRIGHT LIZ LAKE ASSOCIATES Reproduced from Ordnance Survey map data by permission of Ordnance Survey © Crown copyright 2016 Licence No.100007196
© Crown copyright and database rights 2016 Ordnance Survey Licence No.0100031673

Stansted:
Unit 1, The Exchange,
9 Station Road, Stansted, CM24 8BE

t +44 (0)1279 647044
e office@lizlake.com
www.lizlake.com

Bristol:
1 Host Street,
Bristol, BS1 5BU

t +44 (0)117 927 1786

Nottingham:
Sutton Place, 49 Stoney St,
Nottingham NG1 1LX

t +44 (0)115 784 3566

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS

- Landscape Design
- Urban Design
- Residential
- Public Realm
- Masterplanning
- Landscape Planning
- Heritage Landscapes
- Gardens and Estates
- Restoration and Conversion
- Places of Worship
- Expert Witness
- Hospitality
- Education
- Retail / Office
- Community
- Ecology
- Arboriculture
- 3D / Graphic Design

HEPWORTH
ACOUSTICS
Noise and Vibration Consultants

WOODLANDS GOLF COURSE, BRISTOL

NOISE IMPACT ASSESSMENT

On behalf of:

[redacted]

Report No: P17-387-R01
December 2017

WOODLANDS GOLF COURSE, BRISTOL

NOISE IMPACT ASSESSMENT

Report prepared by:
Hepworth Acoustics Ltd
First Floor Aztec Centre
Aztec West
Almondsbury
Bristol
BS32 4TD

On behalf of:
[redacted]

Report prepared by: Graham Bowland BSc MIOA – Technical Director	[redacted]
Report prepared by: Donald Quinn BSc FIOA – Managing Director	[redacted]

CONTENTS

1.0	INTRODUCTION	1
2.0	ACOUSTIC CRITERIA	2
3.0	NOISE SURVEY	5
4.0	NOISE ASSESSMENT AND MITIGATION MEASURES	8
5.0	SUMMARY AND CONCLUSIONS	11

FIGURE 1: SITE BOUNDARY AND NOISE MEASUREMENT LOCATIONS 12

FIGURE 2: CONCEPT MASTERPLAN 13

FIGURE 3: BASELINE NOISE CONTOURS – DAYTIME AT 1.5 METRES (dB $L_{Aeq,16hr}$) 14

FIGURE 4: BASELINE NOISE CONTOURS – NIGHT-TIME AT 4.5 METRES (dB $L_{Aeq,8hr}$) 15

APPENDIX I: NOISE UNITS & INDICES 16

APPENDIX II: NOISE SURVEY RESULTS 18

1.0 INTRODUCTION

1.1 Hepworth Acoustics Ltd was commissioned to carry out a noise assessment relating to the proposed residential-led mixed-use development at Woodlands Golf Course, Bristol.

1.2 The site located to the east of the Almondsbury Interchange, which is the intersection of the M4, running southeast-to-northwest, and the M5 running southwest-to-northeast.

1.3 The site is currently occupied by two 18-hole golf courses and ancillary facilities.

1.4 There is substantial existing bunding in place around the southwest and northwest boundaries of the site. The extent of the bunding varies around those boundaries and is greatest at the western edge, pointing directly to the centre of the interchange, but tapers down in areas very broadly aligned with each end of the southbound M5 to southbound M4 slip road, at the points the slip road separates from/joins the main carriageway.

1.5 At the point of connection of the above slip road and southbound M4, the reduced bund height is seemingly to allow passage of existing power lines that cross the site on existing pylons. It is understood that as part of the development proposals the pylons are to be removed and the power lines routed underground.

1.6 The noise climate at the site is dominated by motorway traffic noise from the M4, the M5 and the interchange slip roads.

1.7 The aim of this assessment is to determine the potential impact of prevailing noise levels on the proposed residential development, and the type and extent of noise mitigation measures that may be required to adequately control noise.

1.8 A site boundary plan is provided in Figure 1. A concept masterplan drawing for the proposed development is provided in Figure 2.

1.9 The various noise indices referred to in this report are described in Appendix I. All noise levels mentioned in the text have been rounded to the nearest decibel, as fractions of decibels are imperceptible.

2.0 ACOUSTIC CRITERIA

2.1 The *National Planning Policy Framework* (NPPF) 2012 provides some general guidance to local authorities on taking noise in to account in planning policies and decisions. This includes guidance that local authorities should '*aim to avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development'* and also '*recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established*.'

2.2 However, there is as yet no specific guidance on numerical acoustic assessment/design criteria for proposed new housing developments provided in the NPPF, accompanying Technical Guidance document, National Planning Practice Guidance 'Noise', nor the *Noise Policy Statement for England* (NPSE) 2010.

ProPG: Planning & Noise

2.3 ProPG: Planning & Noise '*Professional Practice Guidance on Planning & Noise'* 2017 provides "guidance on a recommended approach to the management of noise within the planning system in England", predominantly for proposed new residential developments on land that is exposed to transportation noise.

2.4 It is noted that the guidance has no legal status. It does not constitute an official government code of practice and does not provide an authoritative interpretation of the law or government policy.

2.5 The ProPG recommends a staged approach to assessment. Stage 1 is an initial site noise risk assessment, indicating whether the proposed site is considered to pose a negligible, low, medium or high risk from a noise perspective.

2.6 At low noise levels, the more likely the site is to be acceptable from a noise perspective provided that a good acoustic design process is followed and an ADS (Acoustic Design Statement) confirms how the adverse impacts of noise will be mitigated and minimised in the finished development. This can be ensured by way of condition.

2.7 As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and an ADS confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development.

2.8 High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS.

2.9 Stage 2 of the recommended approach in ProPG is a full assessment to consider good acoustic design. The guidelines of ProPG in terms of suitable acoustic design criteria are broadly consistent with the guidance of BS 8233, and the sound insulation recommendations made later in this report have been designed to achieve the BS8233 guidelines, as described below.

BS 8233

2.10 British Standard 8233: 2014 *Guidance on sound insulation and noise reduction for buildings,* which carries the full weight of an adopted British Standard recommends guidance on design criteria for acceptable noise levels within residential accommodation. BS 8233 guidelines for the daytime (0700-2300hrs) and night-time (2300-0700hrs) periods are summarised in Table 1.

Table 1 : BS 8233 Recommended Acoustic Design Criteria

Activity	Location	Internal Noise Levels	
		Daytime 0700-2300hrs	Night-time 2300-0700hrs
Resting	Living room	35 dB $L_{Aeq,16hr}$	-
Dining	Dining room / area	40 dB $L_{Aeq,16hr}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$

2.11 BS 8233 also states that, "*where development is considered necessary or desirable … the internal target levels* [i.e. those in Table 1] *may be relaxed by up to 5dB and reasonable internal conditions still achieved*".

2.12 BS 8233 clarifies that the above guidance relates only to noise without specific character (e.g. such as that which has a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content) and that where such characteristics are present, lower noise limits might be appropriate.

2.13 Further, BS 8233 states that if there is a reliance on closed windows to meet the guide values, "*there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level*". Further, it is stated that assessments should be based on a room with "*adequate ventilation provided (e.g. trickle ventilators should be open)*".

2.14 BS 8233 also recognises that regular individual noise events at night can cause sleep disturbance. Peaks of noise from individual events are usually described in terms of L_{Amax} values and these can be highly variable and unpredictable. ProPG states that "*in most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events*". This is broadly consistent with research described in WHO *Community Noise Guidelines* that states "*for a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{Amax} more than 10-15 times per night*".

2.15 Regarding outdoor living areas, BS 8233 states that "*it is desirable that the external noise level does not exceed 50dB $L_{Aeq,T}$, with an upper guideline value of 55dB L_{Aeq}, which would be acceptable in noisier environments. However, it is recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas such as city centres or urban areas adjoining the strategic transport network, compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, developments should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited*".

3.0 NOISE SURVEY

3.1 A survey of prevailing road traffic noise levels was carried out at the site over the course of Wednesday 15 – Friday 17 November 2017.

3.2 Continuous noise monitoring was undertaken in sequential 10-minute samples at two locations, aligned with each end of the southbound M5 to southbound M4 slip road, at the points the slip road separates from / joins the main carriageway, as identified as Location A1 and A2 in Figure 1.

3.3 The overall daytime and night-time noise levels at each location was determined from the data measured over the full 48-hr period commencing at 1620hrs on Wednesday 15 November 2017.

3.4 Further short-term attended noise measurements were undertaken over the period 1150-1610hrs on Friday 17 November 2017 at each of Locations B1 – B3 and C1 – C6, identified in Figure 1. All noise measurements at Locations B1 – B3 and C1 – C6 were undertaken in 10-minute samples, and these were each concurrent with individual 10-minute measurement samples at Location A1 and A2.

3.5 To clarify the location references, those prefixed with 'A' are permanent locations where 48-hour monitoring was undertaken; those prefixed with 'B' are supplementary locations that are close to the site boundary in relatively elevated locations, from which there is a clear line-of-sight to the adjacent carriageways, hence providing useful reference noise levels for those roads, but not representative of actual areas of proposed residential development; and those prefixed with 'C' are supplementary locations that are representative of actual areas of proposed residential development, as per the concept masterplan provided in Figure 2.

3.6 The daytime $L_{Aeq,16hr}$ and night-time $L_{Aeq,8hr}$ noise exposure values at Locations A1 and A2 have been determined from the logarithmic average of all measured $L_{Aeq,10min}$ noise measurement samples over each of those periods. To provide a robust interpretation of WHO guidelines relating to L_{Amax}, the overall night-time L_{Amax} noise levels at Locations A1 and A2 have been determined for assessment purposes as the measured $L_{Amax,10min}$ exceeded no more than 5 times over the full night-time period.

3.7 In broad accordance with the 'Comparative Measurements' technique set out in the Department of Transport document 'Calculation of Road Traffic Noise' (CRTN), 1988, the overall daytime and night-time noise levels at Locations B1 – B3 and C1 – C6 have been determined by applying the average difference in measured 10-minute samples noise levels at these locations with the concurrent measurements at Location A1 and/or A2 (as appropriate), to the overall daytime and night-time noise levels determined by way of continuous 48-hour monitoring at those reference locations.

3.8 Overall daytime and night-time noise levels are presented in Table 2.

Table 2 : Overall Daytime and Night-time Noise Levels

Location	Daytime (0700-2300hrs)	Night-time (2300-0700hrs)	
	dB $L_{Aeq,16hr}$	dB $L_{Aeq,8hr}$	dB L_{Amax}
A1	67	63	72
A2	59	55	64
B1	77	73	82
B2	70	66	76
B3	73	69	78
C1	58	54	63
C2	61	57	66
C3	54	50	59
C4	49	45	55
C5	59	55	64
C6	61	57	66

3.9 The daytime and night-time noise levels have been used to calibrate the noise levels attributable to the M4 and M5 within a computerised noise model, generated using the CadnaA noise prediction software. This software enables a 3-dimensional computer model of the topography of the site and the surrounding area to be used as a basis for undertaking automated noise calculations. Geographical data for the site and surroundings (including ground height data) was obtained from Ordnance Survey digital data.

3.10 The daytime baseline noise model at 1.5m above local ground height is provided in Figure 3 and the night-time baseline model at 4.5m above local ground height in Figure 4.

Survey Details

3.11 Noise measurements were undertaken at Location A1 using a Norsonic 118 Type 1 Integrating Sound Level Meter (serial no. 31617), at Location A2 using a Bruel & Kjaer 2250 Type 1 Integrating Sound Level Meter (serial no. 2506359), and at all other locations using a Bruel & Kjaer 2260 Type 1 Integrating Sound Level Meter (serial no. 2467014).

3.12 Calibration checks were carried out on both Sound Level Meters before and after the surveys using a Bruel & Kjaer Acoustic Calibrator, Type 4231 (serial no. 2389221), and no variation in the calibration levels occurred. The internal clocks on the three sound level meters were synchronised prior to measurements. The measurement microphones were fitted with windshields and mounted in 'free-field' conditions at 1.5m above local ground at all locations.

3.13 Weather conditions were dry with westerly winds of speeds typically up to 5m/s, hence with a positive vector from the Almondsbury Interchange towards the site.

3.14 All measured noise levels are fully detailed in Appendix II.

4.0 NOISE ASSESSMENT AND MITIGATION MEASURES

4.1 As would be expected, at the locations in close proximity to the M4 and M5 and the interchange (i.e. measurement locations prefixed with 'B'), where there is a clear line-of-sight to the adjacent carriageways, the noise levels are generally high.

4.2 Conversely, noise levels at locations that are representative of actual areas of proposed residential development, as per the concept masterplan provided in Figure 2 (i.e. measurement locations prefixed 'C') are more modest, typically up to 61dB $L_{Aeq,16hr}$ during the daytime and 57dB $L_{Aeq,8hr}$ during the night-time.

4.3 In many parts of the site where residential development is proposed closest to the boundaries to the M4 and M5 and the interchange, noise levels are considerably lower than these values. The fluctuations are generally due to the extent of acoustic screening provided by the existing bunding around those boundaries, which vary in size.

4.4 The best protected parts of the proposed residential development areas close to the boundaries to the adjacent roads, are towards the west of the site, aligned with the southbound M5 to southbound M4 slip road. This is due in part to the very substantial section of existing bunding around the site adjacent to this slip area, and also the greater distance from the full 3-lane sections of either motorway.

4.5 In other areas of the site where the bunding is less substantial, such as adjacent to the M4 where there is a break in the bunding to allow power lines to pass on existing pylons, the acoustic screening provided is diminished. However, even in these areas, at proposed residential development areas, noise levels are relatively modest.

4.6 In terms of potentially necessary noise mitigation measures to ensure adequate control of motorway noise in accordance with BS 8233 / WHO guidelines in internal areas, even in the slightly higher noise level areas of proposed development (as per Figure 2), it is considered that requirements will be relatively modest. In most if not all areas, it is anticipated that standard thermal double glazing (e.g. two 4mm thick standard panes on a minimum 12mm air cavity; i.e. 4-12-4) will be adequate. Any enhancements that may prove necessary based on the concept masterplan in Figure 2 would be very modest and apply only in worst case areas.

4.7 Notwithstanding, in the slightly higher noise level areas it is likely that acoustic trickle ventilators rated at up to approximately 40dB $D_{n,e,w}$ will be needed. In the best protected areas, even including some areas in relatively close proximity to the motorways and interchange, lower specifications or simple standard non-acoustic trickle ventilators will be adequate.

4.8 The precise requirements in respect of glazing and acoustic trickle ventilators (including any possible requirements for more substantially upgraded glazing in the event of significant deviations from the concept masterplan in Figure 2) will be dependent upon numerous variables, including final site layout, plot orientations and room/window dimensions, and whether any further physical acoustic screening is introduced. As such, this matter would usually be readily controlled at outline planning stage by way of a suitable worded condition, to be discharged by presentation of the necessary façade mitigation measures as part of reserved matters application(s).

4.9 With regard to achieving adequate control of motorway noise in accordance with BS 8233 guidelines in external amenity areas, it can be seen from the noise survey and acoustic modelling results that in most areas where residential development is proposed closest to the boundaries to the M4 and M5 and the interchange, noise levels exceed the 'desirable' target of 50dB $L_{Aeq,T}$, and in many areas also exceed the 'upper guideline value' of 55dB $L_{Aeq,T}$.

4.10 To provide additional attenuation of noise levels in private gardens where necessary, it is recommended that this may be achieved by way of orientation of new dwellings to front outwards in the direction of the adjacent roads, such that the rear gardens are well protected by the buildings themselves. This is generally reflected in the concept masterplan in Figure 2, which indicates private drives and access roads to the outside of the relevant parcels.

4.11 As an alternative, or in any areas where layout design requirements necessitate orientation of rear gardens to the 'exposed' site of the new dwellings, further control of external noise may be achieved by way of localised purpose-build acoustic screens, talking the form of garden walls/fences. However, it is likely that such screens may need to be, indicatively, at least 2.5m in height in order to achieve appreciable additional attenuation. This is due to the substantial boundary screening already provided by the existing bunding.

4.12 Also, it may be possible to achieve some reduction of external noise levels at the site by way or enhancement of the existing bunding around the site. For example, where there is a break in the bunding adjacent to the M4 to allow power lines to pass on existing pylons, given that development proposals included for removing of pylons and underground routing of the power lines, infill bunding could potentially be introduced.

4.13 In the case that infill bunding in the area described above or in any other areas, or in the case that the height of existing bunding were to be enhanced in any areas, it is likely that the extent of mitigation measures needed at the development plots/buildings themselves (e.g. in terms of glazing/ventilation, localised screening and orientation, as discussed herein) will be lessened.

4.14 In any case, in areas furthest from the motorways and interchange existing noise levels are lower, as would be expected, and may be anticipated to be lower still post-development, due to the acoustic screening provided by the 'outer' areas of development closer to the roads towards the west (including the southwest and northwest).

4.15 As the current proposals are in outline form, it is recommended that specific details of appropriate noise mitigation measures are enforced for planning purposes by way of a suitable planning condition. However, subject to careful implementation of the recommendations set out here, there is not considered to be any material constraint to implementing measures that secure acceptable internal and outdoor acoustic conditions for residential purposes across the site, in accordance with the guidelines set out in BS 8233, WHO and ProPG: Planning & Noise.

5.0 SUMMARY AND CONCLUSIONS

5.1 Hepworth Acoustics has undertaken a road traffic noise assessment for a proposed residential-led mixed-use development at Woodlands Golf Course, Bristol.

5.2 A noise survey has been undertaken at the site and daytime and night-time noise levels have been determined.

5.3 Outline recommendations of appropriate noise mitigation measures have been made in order to achieve acceptable internal and outdoor acoustic conditions for residential purposes across the site, in accordance with the guidelines set out in BS 8233 and ProPG: Planning & Noise.

Figure 1: Site Boundary and Noise Measurement Locations

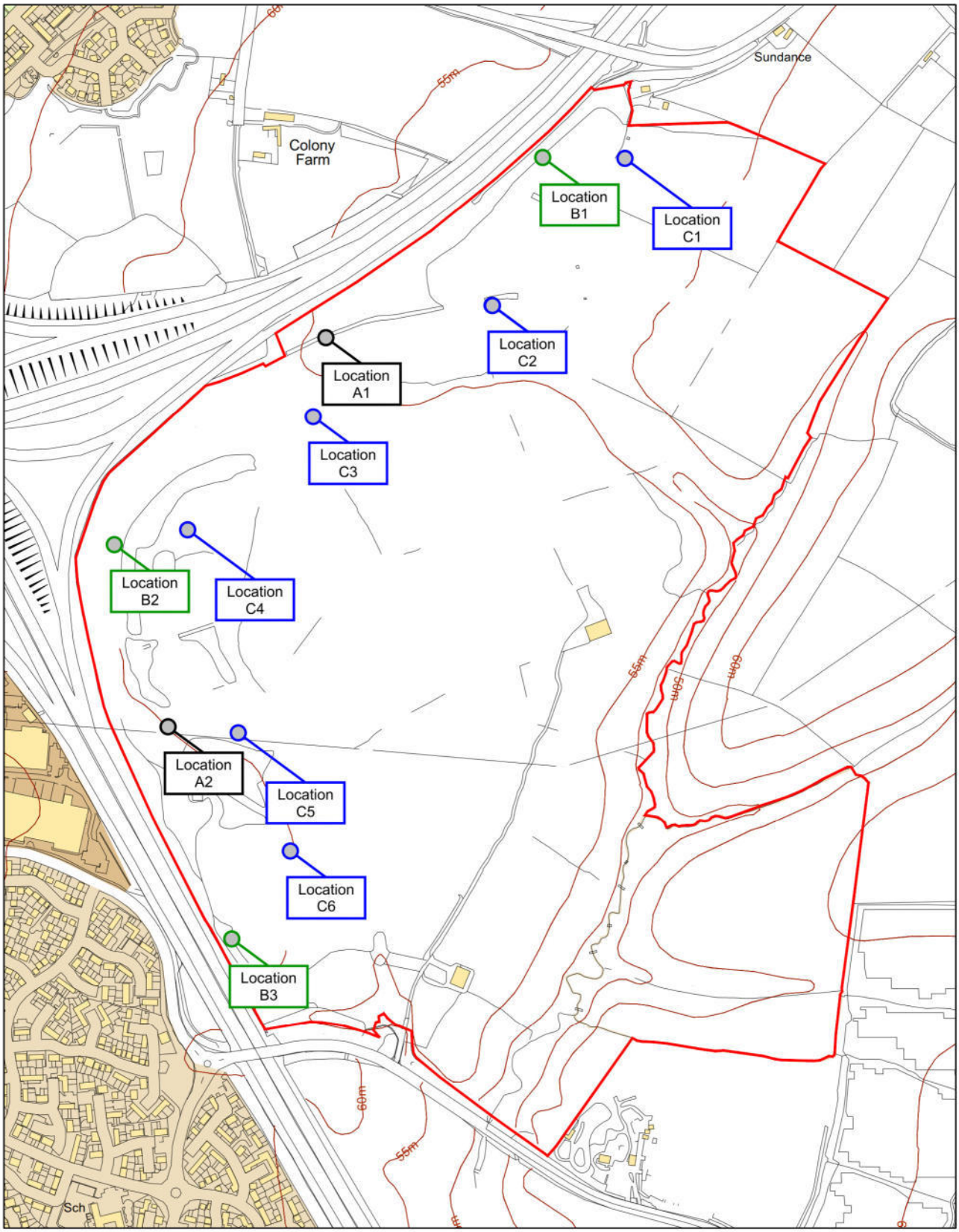


Figure 2: Concept Masterplan



Figure 3: Baseline Noise Contours – Daytime at 1.5 metres (dB $L_{Aeq,16hr}$)

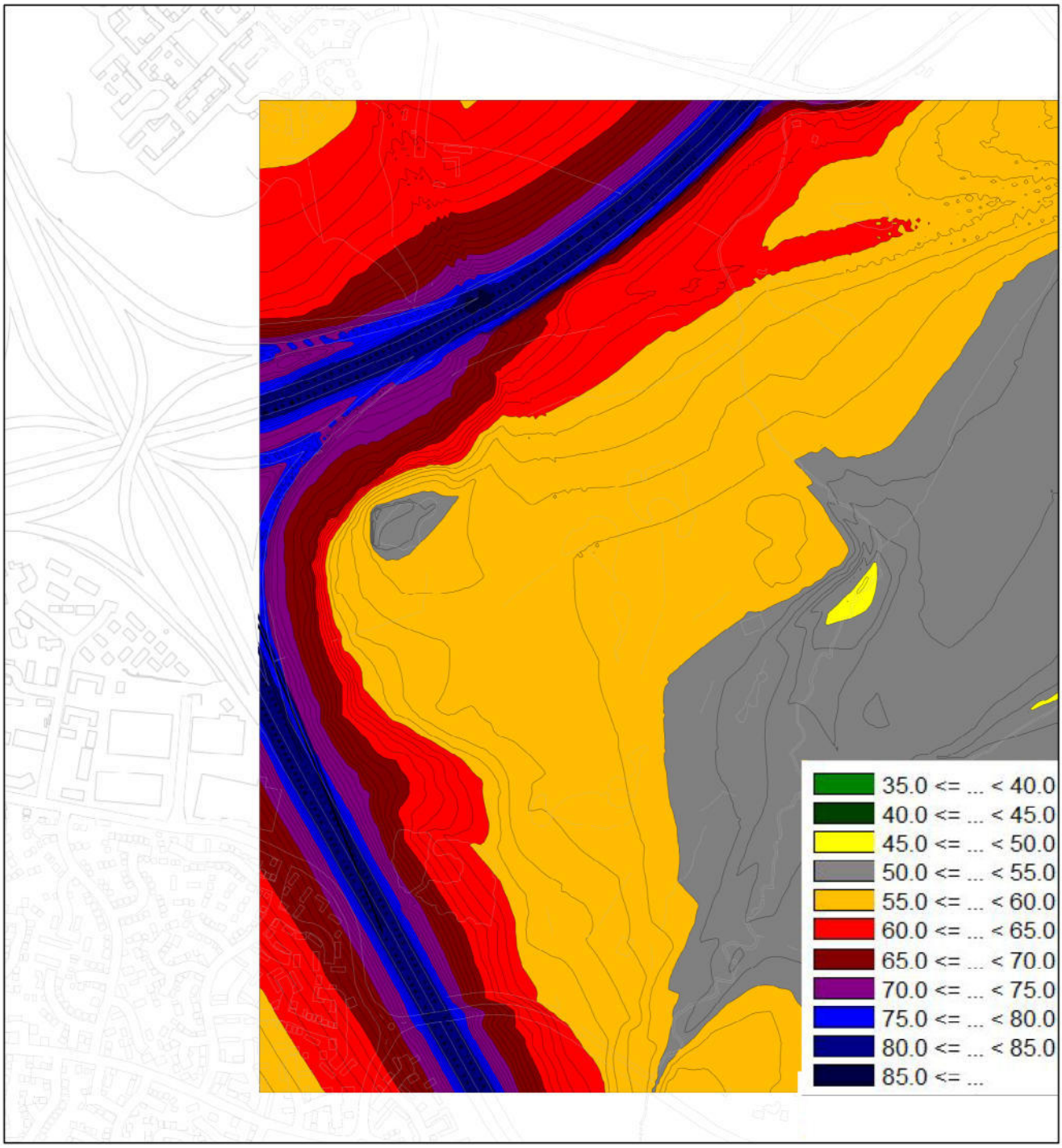
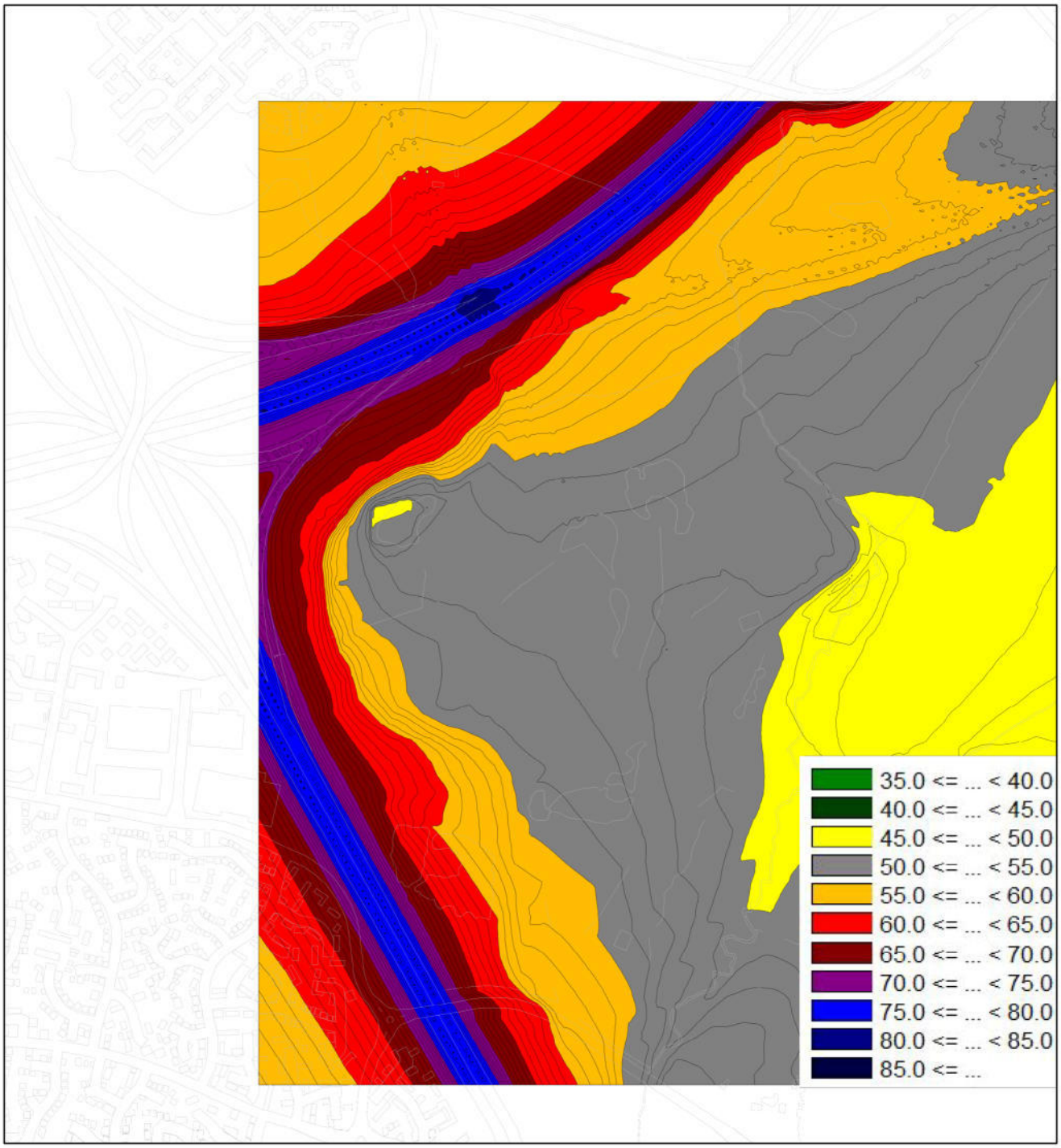


Figure 4: Baseline Noise Contours – Night-time at 4.5m (dB $L_{Aeq,8hr}$)



Appendix I: Noise Units & Indices

Sound and the decibel

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120dB (threshold of pain).

Due to the logarithmic nature of decibels, when two noises of the same level are combined together, the total noise level is (under normal circumstances) 3 dB(A) higher than each of the individual noise levels e.g. 60 dB(A) plus 60 dB(A) = 63 dB(A). In terms of perceived 'loudness', a 3 dB(A) variation in noise level is a relatively small (but nevertheless just noticeable) change. An increase in noise level of 10 dB(A) generally corresponds to a doubling of perceived loudness. Likewise, a reduction in noise level of 10 dB(A) generally corresponds to a halving of perceived loudness.

Frequency and Hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kilohertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20 kHz. However, the upper frequency limit gradually reduces as a person gets older.

The ear is not equally sensitive to sound at all frequencies. It is less sensitive to sound at low and very high frequencies, compared with the frequencies in between. Therefore, when measuring a sound made up of different frequencies, it is often useful to 'weight' each frequency appropriately, so that the measurement correlates better with what a person would actually hear. This is usually achieved by using an electronic filter called the 'A' weighting, which is built into sound level meters. Noise levels measured using the 'A' weighting are denoted dB(A) or dBA.

Glossary of Terms

When a noise level is constant and does not fluctuate, it can be described adequately by measuring the dB(A) level. However, when the noise level varies with time, the measured dB(A) level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple dB(A) value. In order to describe noise where the level is continuously varying, a number of other indices can be used. The indices used in this report are described below.

L_{Aeq} This is the A–weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period. In other words, L_{Aeq} is the level of a continuous noise which has the same total (A–weighted) energy as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for all forms of environmental noise.

L_{Amax} This is the maximum A-weighted noise level that was recorded during the monitoring period.

L_{A10} This is the A-weighted noise level exceeded for 90% of the time period. L_{A10} is used as a measure of road traffic noise.

L_{A90} This is the A-weighted noise level exceeded for 90% of the time period. L_{A90} is used as a measure of background noise.

Appendix II: Noise Survey Results

Location A1:

Date	Time		Noise Level dB			
	Start	End	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
15/11/2017	16:20	16:30	67	72	69	65
15/11/2017	16:30	16:40	68	73	69	66
15/11/2017	16:40	16:50	67	73	69	65
15/11/2017	16:50	17:00	67	70	68	65
15/11/2017	17:00	17:10	68	78	69	65
15/11/2017	17:10	17:20	68	73	69	66
15/11/2017	17:20	17:30	68	71	69	66
15/11/2017	17:30	17:40	68	72	69	65
15/11/2017	17:40	17:50	68	71	69	65
15/11/2017	17:50	18:00	68	72	69	66
15/11/2017	18:00	18:10	68	72	69	65
15/11/2017	18:10	18:20	67	72	69	65
15/11/2017	18:20	18:30	67	71	69	65
15/11/2017	18:30	18:40	66	70	68	64
15/11/2017	18:40	18:50	66	71	68	63
15/11/2017	18:50	19:00	64	70	66	61
15/11/2017	19:00	19:10	62	67	64	59
15/11/2017	19:10	19:20	62	67	64	59
15/11/2017	19:20	19:30	62	68	65	59
15/11/2017	19:30	19:40	62	68	64	59
15/11/2017	19:40	19:50	63	70	65	60
15/11/2017	19:50	20:00	64	69	66	60
15/11/2017	20:00	20:10	64	71	66	61
15/11/2017	20:10	20:20	64	69	66	60
15/11/2017	20:20	20:30	64	71	66	61
15/11/2017	20:30	20:40	63	69	66	60
15/11/2017	20:40	20:50	63	70	66	60
15/11/2017	20:50	21:00	62	69	64	58
15/11/2017	21:00	21:10	61	67	63	57
15/11/2017	21:10	21:20	61	68	63	57
15/11/2017	21:20	21:30	62	68	64	57
15/11/2017	21:30	21:40	61	69	64	58
15/11/2017	21:40	21:50	61	69	64	57
15/11/2017	21:50	22:00	63	69	65	58
15/11/2017	22:00	22:10	61	67	64	56
15/11/2017	22:10	22:20	62	68	64	58
15/11/2017	22:20	22:30	62	69	64	58
15/11/2017	22:30	22:40	61	68	64	57
15/11/2017	22:40	22:50	61	70	63	56
15/11/2017	22:50	23:00	61	68	63	56

Date	Time		Noise Level dB			
	Start	End	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
15/11/2017	23:00	23:10	60	67	63	54
15/11/2017	23:10	23:20	59	66	62	55
15/11/2017	23:20	23:30	59	67	62	54
15/11/2017	23:30	23:40	59	66	62	53
15/11/2017	23:40	23:50	60	67	63	53
15/11/2017	23:50	00:00	60	67	63	54
16/11/2017	00:00	00:10	60	67	63	52
16/11/2017	00:10	00:20	59	68	62	53
16/11/2017	00:20	00:30	59	69	63	51
16/11/2017	00:30	00:40	59	68	63	51
16/11/2017	00:40	00:50	59	67	62	52
16/11/2017	00:50	01:00	58	67	62	51
16/11/2017	01:00	01:10	57	66	62	49
16/11/2017	01:10	01:20	58	68	62	51
16/11/2017	01:20	01:30	57	65	61	49
16/11/2017	01:30	01:40	59	66	63	50
16/11/2017	01:40	01:50	58	67	61	51
16/11/2017	01:50	02:00	58	69	62	49
16/11/2017	02:00	02:10	59	68	62	49
16/11/2017	02:10	02:20	59	67	62	50
16/11/2017	02:20	02:30	59	66	62	51
16/11/2017	02:30	02:40	59	67	63	51
16/11/2017	02:40	02:50	58	66	62	51
16/11/2017	02:50	03:00	59	68	62	50
16/11/2017	03:00	03:10	60	68	63	54
16/11/2017	03:10	03:20	59	68	62	52
16/11/2017	03:20	03:30	59	67	62	51
16/11/2017	03:30	03:40	60	67	63	55
16/11/2017	03:40	03:50	59	67	62	52
16/11/2017	03:50	04:00	59	67	63	54
16/11/2017	04:00	04:10	59	66	63	50
16/11/2017	04:10	04:20	60	69	63	54
16/11/2017	04:20	04:30	61	68	64	56
16/11/2017	04:30	04:40	62	68	65	57
16/11/2017	04:40	04:50	62	68	65	58
16/11/2017	04:50	05:00	62	70	64	58
16/11/2017	05:00	05:10	62	69	65	57
16/11/2017	05:10	05:20	62	68	65	58
16/11/2017	05:20	05:30	63	69	65	57
16/11/2017	05:30	05:40	63	67	65	59
16/11/2017	05:40	05:50	63	71	65	60
16/11/2017	05:50	06:00	63	70	65	60
16/11/2017	06:00	06:10	64	70	66	61
16/11/2017	06:10	06:20	65	70	67	62

Date	Time		Noise Level dB			
	Start	End	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
16/11/2017	06:20	06:30	67	74	68	64
16/11/2017	06:30	06:40	67	72	69	64
16/11/2017	06:40	06:50	68	72	69	66
16/11/2017	06:50	07:00	68	75	70	67
16/11/2017	07:00	07:10	69	73	70	67
16/11/2017	07:10	07:20	69	73	70	67
16/11/2017	07:20	07:30	68	72	69	66
16/11/2017	07:30	07:40	67	71	68	65
16/11/2017	07:40	07:50	67	71	68	66
16/11/2017	07:50	08:00	67	72	68	65
16/11/2017	08:00	08:10	67	70	68	65
16/11/2017	08:10	08:20	67	71	69	66
16/11/2017	08:20	08:30	67	72	68	65
16/11/2017	08:30	08:40	66	71	68	64
16/11/2017	08:40	08:50	67	71	69	65
16/11/2017	08:50	09:00	68	72	69	65
16/11/2017	09:00	09:10	67	72	69	65
16/11/2017	09:10	09:20	67	72	69	64
16/11/2017	09:20	09:30	67	71	69	65
16/11/2017	09:30	09:40	67	71	68	64
16/11/2017	09:40	09:50	66	71	68	64
16/11/2017	09:50	10:00	67	72	69	64
16/11/2017	10:00	10:10	67	72	69	65
16/11/2017	10:10	10:20	67	72	69	65
16/11/2017	10:20	10:30	67	72	69	65
16/11/2017	10:30	10:40	67	71	69	65
16/11/2017	10:40	10:50	67	74	69	65
16/11/2017	10:50	11:00	67	72	69	65
16/11/2017	11:00	11:10	68	72	70	66
16/11/2017	11:10	11:20	68	73	70	66
16/11/2017	11:20	11:30	68	74	70	66
16/11/2017	11:30	11:40	68	73	70	65
16/11/2017	11:40	11:50	68	72	69	65
16/11/2017	11:50	12:00	67	74	69	64
16/11/2017	12:00	12:10	68	73	69	65
16/11/2017	12:10	12:20	69	73	70	67
16/11/2017	12:20	12:30	68	73	70	66
16/11/2017	12:30	12:40	68	73	70	66
16/11/2017	12:40	12:50	68	72	70	65
16/11/2017	12:50	13:00	67	73	69	65
16/11/2017	13:00	13:10	67	73	69	65
16/11/2017	13:10	13:20	68	73	69	65
16/11/2017	13:20	13:30	68	72	70	65
16/11/2017	13:30	13:40	68	74	70	66

Date	Time		Noise Level dB			
	Start	End	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
16/11/2017	13:40	13:50	69	74	70	67
16/11/2017	13:50	14:00	69	73	70	67
16/11/2017	14:00	14:10	69	74	71	67
16/11/2017	14:10	14:20	70	75	71	67
16/11/2017	14:20	14:30	69	74	71	67
16/11/2017	14:30	14:40	69	74	71	67
16/11/2017	14:40	14:50	69	74	71	66
16/11/2017	14:50	15:00	69	75	71	66
16/11/2017	15:00	15:10	69	76	70	67
16/11/2017	15:10	15:20	68	74	70	65
16/11/2017	15:20	15:30	67	71	69	65
16/11/2017	15:30	15:40	67	71	68	65
16/11/2017	15:40	15:50	67	72	68	65
16/11/2017	15:50	16:00	66	71	68	64
16/11/2017	16:00	16:10	66	72	68	64
16/11/2017	16:10	16:20	66	72	68	65
16/11/2017	16:20	16:30	67	71	68	65
16/11/2017	16:30	16:40	66	70	68	64
16/11/2017	16:40	16:50	66	70	67	64
16/11/2017	16:50	17:00	65	69	66	63
16/11/2017	17:00	17:10	66	70	67	64
16/11/2017	17:10	17:20	66	70	68	64
16/11/2017	17:20	17:30	66	73	68	64
16/11/2017	17:30	17:40	66	70	68	65
16/11/2017	17:40	17:50	66	70	68	64
16/11/2017	17:50	18:00	66	70	68	65
16/11/2017	18:00	18:10	66	70	68	64
16/11/2017	18:10	18:20	66	70	68	64
16/11/2017	18:20	18:30	67	71	68	65
16/11/2017	18:30	18:40	67	72	68	65
16/11/2017	18:40	18:50	66	70	68	64
16/11/2017	18:50	19:00	67	71	68	65
16/11/2017	19:00	19:10	66	70	68	64
16/11/2017	19:10	19:20	66	70	68	64
16/11/2017	19:20	19:30	66	71	68	63
16/11/2017	19:30	19:40	68	73	70	65
16/11/2017	19:40	19:50	67	72	69	65
16/11/2017	19:50	20:00	67	73	69	64
16/11/2017	20:00	20:10	66	70	68	63
16/11/2017	20:10	20:20	67	72	69	64
16/11/2017	20:20	20:30	67	73	69	64
16/11/2017	20:30	20:40	67	72	69	63
16/11/2017	20:40	20:50	68	74	70	64
16/11/2017	20:50	21:00	67	74	69	62

Date	Time		Noise Level dB			
	Start	End	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
16/11/2017	21:00	21:10	67	74	69	62
16/11/2017	21:10	21:20	66	73	68	62
16/11/2017	21:20	21:30	66	73	69	62
16/11/2017	21:30	21:40	66	72	68	62
16/11/2017	21:40	21:50	66	71	68	62
16/11/2017	21:50	22:00	66	73	68	63
16/11/2017	22:00	22:10	64	70	67	61
16/11/2017	22:10	22:20	65	71	67	61
16/11/2017	22:20	22:30	65	71	68	60
16/11/2017	22:30	22:40	64	70	67	59
16/11/2017	22:40	22:50	63	70	65	59
16/11/2017	22:50	23:00	64	71	66	59
16/11/2017	23:00	23:10	64	72	66	59
16/11/2017	23:10	23:20	64	71	66	59
16/11/2017	23:20	23:30	64	71	66	59
16/11/2017	23:30	23:40	64	71	66	60
16/11/2017	23:40	23:50	63	69	65	58
16/11/2017	23:50	00:00	62	70	65	56
17/11/2017	00:00	00:10	63	70	66	57
17/11/2017	00:10	00:20	63	71	67	54
17/11/2017	00:20	00:30	62	70	65	56
17/11/2017	00:30	00:40	62	69	66	56
17/11/2017	00:40	00:50	62	70	65	57
17/11/2017	00:50	01:00	61	68	65	55
17/11/2017	01:00	01:10	62	68	65	53
17/11/2017	01:10	01:20	61	70	64	55
17/11/2017	01:20	01:30	61	69	64	55
17/11/2017	01:30	01:40	60	69	64	51
17/11/2017	01:40	01:50	61	69	64	54
17/11/2017	01:50	02:00	61	69	64	56
17/11/2017	02:00	02:10	61	68	64	53
17/11/2017	02:10	02:20	63	71	66	55
17/11/2017	02:20	02:30	62	71	65	54
17/11/2017	02:30	02:40	61	69	65	55
17/11/2017	02:40	02:50	62	70	65	54
17/11/2017	02:50	03:00	62	70	65	57
17/11/2017	03:00	03:10	62	70	65	57
17/11/2017	03:10	03:20	61	70	64	56
17/11/2017	03:20	03:30	61	68	64	56
17/11/2017	03:30	03:40	61	69	65	55
17/11/2017	03:40	03:50	61	69	64	55
17/11/2017	03:50	04:00	62	69	64	56
17/11/2017	04:00	04:10	61	67	64	57
17/11/2017	04:10	04:20	61	70	65	56

Date	Time		Noise Level dB			
	Start	End	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
17/11/2017	04:20	04:30	62	71	65	57
17/11/2017	04:30	04:40	63	69	65	59
17/11/2017	04:40	04:50	63	70	65	58
17/11/2017	04:50	05:00	63	70	66	58
17/11/2017	05:00	05:10	64	70	66	60
17/11/2017	05:10	05:20	64	71	66	60
17/11/2017	05:20	05:30	64	69	66	62
17/11/2017	05:30	05:40	65	71	68	62
17/11/2017	05:40	05:50	66	71	68	63
17/11/2017	05:50	06:00	66	70	68	63
17/11/2017	06:00	06:10	66	70	67	63
17/11/2017	06:10	06:20	67	74	69	64
17/11/2017	06:20	06:30	68	74	69	65
17/11/2017	06:30	06:40	68	73	70	66
17/11/2017	06:40	06:50	68	72	70	66
17/11/2017	06:50	07:00	69	72	70	67
17/11/2017	07:00	07:10	69	73	71	68
17/11/2017	07:10	07:20	70	74	71	68
17/11/2017	07:20	07:30	70	74	71	68
17/11/2017	07:30	07:40	69	74	71	67
17/11/2017	07:40	07:50	69	73	71	67
17/11/2017	07:50	08:00	68	72	69	66
17/11/2017	08:00	08:10	68	72	70	66
17/11/2017	08:10	08:20	68	72	69	66
17/11/2017	08:20	08:30	68	73	69	65
17/11/2017	08:30	08:40	68	72	69	65
17/11/2017	08:40	08:50	68	73	70	66
17/11/2017	08:50	09:00	66	70	68	63
17/11/2017	09:00	09:10	66	71	67	64
17/11/2017	09:10	09:20	66	70	67	64
17/11/2017	09:20	09:30	65	70	67	64
17/11/2017	09:30	09:40	65	69	67	63
17/11/2017	09:40	09:50	64	69	66	62
17/11/2017	09:50	10:00	63	68	65	61
17/11/2017	10:00	10:10	63	68	65	61
17/11/2017	10:10	10:20	64	69	66	62
17/11/2017	10:20	10:30	64	68	66	62
17/11/2017	10:30	10:40	63	68	65	61
17/11/2017	10:40	10:50	64	68	65	61
17/11/2017	10:50	11:00	64	69	66	62
17/11/2017	11:00	11:10	64	76	66	61
17/11/2017	11:10	11:20	64	68	65	61
17/11/2017	11:20	11:30	67	73	68	64
17/11/2017	11:30	11:40	67	72	69	65

Date	Time		Noise Level dB			
	Start	End	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
17/11/2017	11:40	11:50	67	72	69	65
17/11/2017	11:50	12:00	67	72	69	65
17/11/2017	12:00	12:10	67	72	69	65
17/11/2017	12:10	12:20	68	73	70	66
17/11/2017	12:20	12:30	68	72	70	65
17/11/2017	12:30	12:40	67	72	69	65
17/11/2017	12:40	12:50	68	74	69	65
17/11/2017	12:50	13:00	67	72	69	65
17/11/2017	13:00	13:10	68	71	69	66
17/11/2017	13:10	13:20	67	72	69	65
17/11/2017	13:20	13:30	67	71	69	65
17/11/2017	13:30	13:40	67	72	69	65
17/11/2017	13:40	13:50	67	71	69	65
17/11/2017	13:50	14:00	67	72	69	65
17/11/2017	14:00	14:10	68	72	69	66
17/11/2017	14:10	14:20	68	72	69	65
17/11/2017	14:20	14:30	68	72	70	66
17/11/2017	14:30	14:40	69	72	70	67
17/11/2017	14:40	14:50	68	72	69	66
17/11/2017	14:50	15:00	68	71	69	66
17/11/2017	15:00	15:10	68	72	69	66
17/11/2017	15:10	15:20	68	74	70	66
17/11/2017	15:20	15:30	69	73	70	67
17/11/2017	15:30	15:40	68	74	70	66
17/11/2017	15:40	15:50	68	74	70	66
17/11/2017	15:50	16:00	68	73	70	66
17/11/2017	16:00	16:10	69	72	70	67
17/11/2017	16:10	16:20	68	72	70	66

Location A2:

Date	Time		Noise Level dB			
	Start	End	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
15/11/2017	16:20	16:30	59	70	60	57
15/11/2017	16:30	16:40	59	61	60	57
15/11/2017	16:40	16:50	58	63	59	57
15/11/2017	16:50	17:00	59	68	59	57
15/11/2017	17:00	17:10	62	76	61	57
15/11/2017	17:10	17:20	59	64	59	57
15/11/2017	17:20	17:30	58	61	59	57
15/11/2017	17:30	17:40	58	63	59	57
15/11/2017	17:40	17:50	58	66	59	56
15/11/2017	17:50	18:00	58	65	59	56
15/11/2017	18:00	18:10	58	61	59	57

Date	Time		Noise Level dB			
	Start	End	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
15/11/2017	18:10	18:20	58	64	59	56
15/11/2017	18:20	18:30	57	61	58	56
15/11/2017	18:30	18:40	57	62	58	55
15/11/2017	18:40	18:50	56	60	58	54
15/11/2017	18:50	19:00	54	57	55	52
15/11/2017	19:00	19:10	53	57	54	51
15/11/2017	19:10	19:20	53	57	55	51
15/11/2017	19:20	19:30	55	60	57	52
15/11/2017	19:30	19:40	55	59	57	53
15/11/2017	19:40	19:50	56	60	58	53
15/11/2017	19:50	20:00	56	65	58	53
15/11/2017	20:00	20:10	56	62	58	52
15/11/2017	20:10	20:20	56	67	58	53
15/11/2017	20:20	20:30	56	60	58	53
15/11/2017	20:30	20:40	56	60	58	52
15/11/2017	20:40	20:50	55	59	57	52
15/11/2017	20:50	21:00	54	62	56	51
15/11/2017	21:00	21:10	53	61	55	50
15/11/2017	21:10	21:20	53	58	55	51
15/11/2017	21:20	21:30	54	61	56	50
15/11/2017	21:30	21:40	53	58	55	50
15/11/2017	21:40	21:50	53	58	55	51
15/11/2017	21:50	22:00	54	62	56	51
15/11/2017	22:00	22:10	54	60	56	52
15/11/2017	22:10	22:20	54	58	56	51
15/11/2017	22:20	22:30	54	59	56	51
15/11/2017	22:30	22:40	53	58	55	49
15/11/2017	22:40	22:50	53	58	55	50
15/11/2017	22:50	23:00	53	59	55	50
15/11/2017	23:00	23:10	53	58	55	49
15/11/2017	23:10	23:20	52	57	55	48
15/11/2017	23:20	23:30	53	62	55	48
15/11/2017	23:30	23:40	53	62	56	49
15/11/2017	23:40	23:50	54	60	56	49
15/11/2017	23:50	00:00	54	61	56	48
16/11/2017	00:00	00:10	53	60	56	47
16/11/2017	00:10	00:20	53	60	56	47
16/11/2017	00:20	00:30	52	60	56	46
16/11/2017	00:30	00:40	52	60	55	45
16/11/2017	00:40	00:50	52	62	55	46
16/11/2017	00:50	01:00	52	59	55	46
16/11/2017	01:00	01:10	51	59	54	43
16/11/2017	01:10	01:20	50	57	53	44
16/11/2017	01:20	01:30	48	55	51	43

Date	Time		Noise Level dB			
	Start	End	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
16/11/2017	01:30	01:40	50	60	53	43
16/11/2017	01:40	01:50	51	59	54	44
16/11/2017	01:50	02:00	50	58	53	43
16/11/2017	02:00	02:10	51	60	54	44
16/11/2017	02:10	02:20	51	60	54	45
16/11/2017	02:20	02:30	51	59	54	44
16/11/2017	02:30	02:40	52	60	55	46
16/11/2017	02:40	02:50	51	59	54	46
16/11/2017	02:50	03:00	52	59	55	47
16/11/2017	03:00	03:10	53	61	56	47
16/11/2017	03:10	03:20	53	63	56	46
16/11/2017	03:20	03:30	51	57	54	44
16/11/2017	03:30	03:40	52	60	55	48
16/11/2017	03:40	03:50	51	58	54	45
16/11/2017	03:50	04:00	52	60	55	46
16/11/2017	04:00	04:10	52	59	55	45
16/11/2017	04:10	04:20	54	60	56	48
16/11/2017	04:20	04:30	54	60	56	48
16/11/2017	04:30	04:40	55	61	57	50
16/11/2017	04:40	04:50	55	62	57	51
16/11/2017	04:50	05:00	55	60	58	51
16/11/2017	05:00	05:10	55	62	57	52
16/11/2017	05:10	05:20	56	64	58	52
16/11/2017	05:20	05:30	56	63	58	54
16/11/2017	05:30	05:40	57	61	59	54
16/11/2017	05:40	05:50	57	62	59	55
16/11/2017	05:50	06:00	57	61	59	55
16/11/2017	06:00	06:10	57	61	59	55
16/11/2017	06:10	06:20	58	62	60	56
16/11/2017	06:20	06:30	59	63	61	57
16/11/2017	06:30	06:40	60	63	61	58
16/11/2017	06:40	06:50	60	69	61	59
16/11/2017	06:50	07:00	60	63	61	59
16/11/2017	07:00	07:10	61	65	63	60
16/11/2017	07:10	07:20	61	64	62	60
16/11/2017	07:20	07:30	59	64	60	57
16/11/2017	07:30	07:40	57	63	58	56
16/11/2017	07:40	07:50	58	61	59	56
16/11/2017	07:50	08:00	58	66	59	56
16/11/2017	08:00	08:10	57	63	59	56
16/11/2017	08:10	08:20	57	61	58	56
16/11/2017	08:20	08:30	59	62	59	58
16/11/2017	08:30	08:40	59	62	60	57
16/11/2017	08:40	08:50	60	64	62	59

Date	Time		Noise Level dB			
	Start	End	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
16/11/2017	08:50	09:00	61	70	62	59
16/11/2017	09:00	09:10	60	65	61	58
16/11/2017	09:10	09:20	60	63	61	59
16/11/2017	09:20	09:30	60	68	61	58
16/11/2017	09:30	09:40	59	63	60	57
16/11/2017	09:40	09:50	59	64	61	57
16/11/2017	09:50	10:00	59	64	60	56
16/11/2017	10:00	10:10	62	74	63	59
16/11/2017	10:10	10:20	63	69	65	61
16/11/2017	10:20	10:30	62	69	63	60
16/11/2017	10:30	10:40	61	67	62	58
16/11/2017	10:40	10:50	60	69	62	58
16/11/2017	10:50	11:00	62	67	63	59
16/11/2017	11:00	11:10	63	67	64	61
16/11/2017	11:10	11:20	64	69	66	62
16/11/2017	11:20	11:30	64	77	66	61
16/11/2017	11:30	11:40	63	70	65	60
16/11/2017	11:40	11:50	64	69	66	61
16/11/2017	11:50	12:00	61	65	62	59
16/11/2017	12:00	12:10	61	67	63	58
16/11/2017	12:10	12:20	63	70	65	61
16/11/2017	12:20	12:30	64	69	66	61
16/11/2017	12:30	12:40	63	67	64	60
16/11/2017	12:40	12:50	63	70	65	60
16/11/2017	12:50	13:00	61	66	63	59
16/11/2017	13:00	13:10	61	65	62	59
16/11/2017	13:10	13:20	62	67	63	59
16/11/2017	13:20	13:30	63	67	64	61
16/11/2017	13:30	13:40	62	77	63	60
16/11/2017	13:40	13:50	63	70	65	61
16/11/2017	13:50	14:00	65	69	67	62
16/11/2017	14:00	14:10	65	69	67	63
16/11/2017	14:10	14:20	63	67	64	60
16/11/2017	14:20	14:30	60	63	61	59
16/11/2017	14:30	14:40	60	63	61	58
16/11/2017	14:40	14:50	60	63	61	58
16/11/2017	14:50	15:00	59	64	61	58
16/11/2017	15:00	15:10	61	68	62	59
16/11/2017	15:10	15:20	59	64	61	57
16/11/2017	15:20	15:30	58	63	60	57
16/11/2017	15:30	15:40	57	61	58	55
16/11/2017	15:40	15:50	57	60	58	54
16/11/2017	15:50	16:00	56	61	57	54
16/11/2017	16:00	16:10	56	67	58	55

Date	Time		Noise Level dB			
	Start	End	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
16/11/2017	16:10	16:20	55	67	57	54
16/11/2017	16:20	16:30	56	62	57	55
16/11/2017	16:30	16:40	55	58	57	54
16/11/2017	16:40	16:50	55	58	56	54
16/11/2017	16:50	17:00	54	57	55	53
16/11/2017	17:00	17:10	55	60	56	54
16/11/2017	17:10	17:20	55	61	57	54
16/11/2017	17:20	17:30	56	60	57	54
16/11/2017	17:30	17:40	56	61	57	54
16/11/2017	17:40	17:50	56	59	57	54
16/11/2017	17:50	18:00	56	61	58	55
16/11/2017	18:00	18:10	56	60	58	55
16/11/2017	18:10	18:20	56	62	57	55
16/11/2017	18:20	18:30	58	65	59	56
16/11/2017	18:30	18:40	58	61	59	56
16/11/2017	18:40	18:50	58	62	59	56
16/11/2017	18:50	19:00	58	63	59	56
16/11/2017	19:00	19:10	57	62	59	55
16/11/2017	19:10	19:20	57	60	59	56
16/11/2017	19:20	19:30	57	62	59	55
16/11/2017	19:30	19:40	59	65	61	57
16/11/2017	19:40	19:50	59	64	61	57
16/11/2017	19:50	20:00	58	62	59	55
16/11/2017	20:00	20:10	56	61	58	55
16/11/2017	20:10	20:20	58	63	60	55
16/11/2017	20:20	20:30	57	63	59	55
16/11/2017	20:30	20:40	58	65	60	55
16/11/2017	20:40	20:50	57	62	59	55
16/11/2017	20:50	21:00	57	62	60	54
16/11/2017	21:00	21:10	57	61	59	54
16/11/2017	21:10	21:20	57	61	59	55
16/11/2017	21:20	21:30	58	63	59	56
16/11/2017	21:30	21:40	58	62	60	56
16/11/2017	21:40	21:50	57	61	59	54
16/11/2017	21:50	22:00	57	62	59	54
16/11/2017	22:00	22:10	55	60	57	53
16/11/2017	22:10	22:20	56	61	58	54
16/11/2017	22:20	22:30	56	62	58	53
16/11/2017	22:30	22:40	54	60	56	50
16/11/2017	22:40	22:50	56	63	59	52
16/11/2017	22:50	23:00	56	65	59	51
16/11/2017	23:00	23:10	57	66	60	50
16/11/2017	23:10	23:20	56	64	59	50
16/11/2017	23:20	23:30	55	64	58	49

Date	Time		Noise Level dB			
	Start	End	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
16/11/2017	23:30	23:40	54	62	57	49
16/11/2017	23:40	23:50	54	61	56	50
16/11/2017	23:50	00:00	54	62	57	48
17/11/2017	00:00	00:10	55	62	58	48
17/11/2017	00:10	00:20	53	60	56	48
17/11/2017	00:20	00:30	54	64	58	46
17/11/2017	00:30	00:40	55	62	58	46
17/11/2017	00:40	00:50	54	63	57	48
17/11/2017	00:50	01:00	54	63	57	48
17/11/2017	01:00	01:10	55	64	58	47
17/11/2017	01:10	01:20	53	60	56	49
17/11/2017	01:20	01:30	53	59	55	49
17/11/2017	01:30	01:40	52	60	55	46
17/11/2017	01:40	01:50	53	63	56	46
17/11/2017	01:50	02:00	52	63	56	44
17/11/2017	02:00	02:10	54	63	58	44
17/11/2017	02:10	02:20	54	62	58	44
17/11/2017	02:20	02:30	53	64	56	45
17/11/2017	02:30	02:40	54	62	57	47
17/11/2017	02:40	02:50	52	61	55	43
17/11/2017	02:50	03:00	51	59	54	45
17/11/2017	03:00	03:10	54	65	58	46
17/11/2017	03:10	03:20	55	63	58	48
17/11/2017	03:20	03:30	53	60	55	48
17/11/2017	03:30	03:40	53	60	56	49
17/11/2017	03:40	03:50	55	62	57	49
17/11/2017	03:50	04:00	54	63	58	48
17/11/2017	04:00	04:10	53	60	56	48
17/11/2017	04:10	04:20	52	58	54	48
17/11/2017	04:20	04:30	51	57	53	48
17/11/2017	04:30	04:40	52	58	54	50
17/11/2017	04:40	04:50	52	58	54	49
17/11/2017	04:50	05:00	54	59	56	50
17/11/2017	05:00	05:10	55	61	57	51
17/11/2017	05:10	05:20	57	62	59	52
17/11/2017	05:20	05:30	56	62	58	53
17/11/2017	05:30	05:40	56	62	58	53
17/11/2017	05:40	05:50	58	63	60	55
17/11/2017	05:50	06:00	58	63	60	55
17/11/2017	06:00	06:10	57	62	58	55
17/11/2017	06:10	06:20	58	63	60	57
17/11/2017	06:20	06:30	59	63	60	56
17/11/2017	06:30	06:40	59	68	61	58
17/11/2017	06:40	06:50	59	62	60	58

Date	Time		Noise Level dB			
	Start	End	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
17/11/2017	06:50	07:00	60	62	61	58
17/11/2017	07:00	07:10	59	69	60	58
17/11/2017	07:10	07:20	60	62	61	58
17/11/2017	07:20	07:30	60	66	61	59
17/11/2017	07:30	07:40	59	62	60	58
17/11/2017	07:40	07:50	59	62	60	58
17/11/2017	07:50	08:00	59	62	60	58
17/11/2017	08:00	08:10	59	62	60	58
17/11/2017	08:10	08:20	59	62	60	58
17/11/2017	08:20	08:30	59	63	60	58
17/11/2017	08:30	08:40	59	63	59	57
17/11/2017	08:40	08:50	59	62	60	58
17/11/2017	08:50	09:00	58	62	60	57
17/11/2017	09:00	09:10	59	62	60	58
17/11/2017	09:10	09:20	59	64	60	58
17/11/2017	09:20	09:30	58	62	60	56
17/11/2017	09:30	09:40	57	62	58	56
17/11/2017	09:40	09:50	57	60	58	56
17/11/2017	09:50	10:00	55	69	57	54
17/11/2017	10:00	10:10	55	60	56	53
17/11/2017	10:10	10:20	54	60	55	53
17/11/2017	10:20	10:30	53	57	55	52
17/11/2017	10:30	10:40	54	57	55	52
17/11/2017	10:40	10:50	54	59	55	52
17/11/2017	10:50	11:00	54	62	56	53
17/11/2017	11:00	11:10	54	57	55	53
17/11/2017	11:10	11:20	55	59	56	53
17/11/2017	11:20	11:30	57	68	59	54
17/11/2017	11:30	11:40	57	65	58	55
17/11/2017	11:40	11:50	57	62	58	55
17/11/2017	11:50	12:00	57	61	59	55
17/11/2017	12:00	12:10	57	61	58	55
17/11/2017	12:10	12:20	57	60	58	55
17/11/2017	12:20	12:30	56	59	58	55
17/11/2017	12:30	12:40	57	60	58	55
17/11/2017	12:40	12:50	58	69	58	55
17/11/2017	12:50	13:00	57	70	59	55
17/11/2017	13:00	13:10	57	64	59	56
17/11/2017	13:10	13:20	58	66	59	56
17/11/2017	13:20	13:30	57	60	58	55
17/11/2017	13:30	13:40	57	61	58	55
17/11/2017	13:40	13:50	57	60	58	55
17/11/2017	13:50	14:00	56	61	58	54
17/11/2017	14:00	14:10	57	60	58	55

Date	Time		Noise Level dB			
	Start	End	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
17/11/2017	14:10	14:20	57	60	58	55
17/11/2017	14:20	14:30	57	61	58	56
17/11/2017	14:30	14:40	57	60	58	55
17/11/2017	14:40	14:50	57	63	58	56
17/11/2017	14:50	15:00	57	60	58	56
17/11/2017	15:00	15:10	58	68	60	56
17/11/2017	15:10	15:20	57	62	58	56
17/11/2017	15:20	15:30	59	63	61	58
17/11/2017	15:30	15:40	60	63	61	58
17/11/2017	15:40	15:50	59	62	60	57
17/11/2017	15:50	16:00	61	74	61	58
17/11/2017	16:00	16:10	60	64	61	59
17/11/2017	16:10	16:20	61	66	62	59

Location B1:

Date	Time		Noise Level dB			
	Start	End	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
17/11/2017	12:20	12:30	78	85	80	76
17/11/2017	12:30	12:40	78	88	80	76

Location B2:

Date	Time		Noise Level dB			
	Start	End	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
17/11/2017	14:20	14:30	70	76	71	69
17/11/2017	14:30	14:40	70	76	71	69

Location B3:

Date	Time		Noise Level dB			
	Start	End	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
17/11/2017	15:50	16:00	74	77	75	73
17/11/2017	16:00	16:10	74	77	75	71

Location C1:

Date	Time		Noise Level dB			
	Start	End	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
17/11/2017	11:50	12:00	58	66	59	56
17/11/2017	12:00	12:10	59	65	61	56

Location C2:

Date	Time		Noise Level dB			
	Start	End	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
17/11/2017	12:50	13:00	61	68	63	58
17/11/2017	13:00	13:10	61	70	63	59

Location C3:

Date	Time		Noise Level dB			
	Start	End	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
17/11/2017	13:20	13:30	53	61	55	51
17/11/2017	13:30	13:40	56	62	57	53

Location C4:

Date	Time		Noise Level dB			
	Start	End	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
17/11/2017	13:50	14:00	49	57	49	47
17/11/2017	14:00	14:10	49	70	50	48

Location C5:

Date	Time		Noise Level dB			
	Start	End	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
17/11/2017	14:50	15:00	57	62	58	56
17/11/2017	15:00	15:10	58	61	59	56

Location C6:

Date	Time		Noise Level dB			
	Start	End	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
17/11/2017	15:20	15:30	61	64	62	60
17/11/2017	15:30	15:40	62	65	63	61

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS

Strategic Landscape and Visual Assessment

Woodlands Garden Village, Bristol

[redacted]

December 2016

Strategic Landscape and Visual Assessment

Woodlands Garden Village, Bristol

[redacted]

December 2016

Prepared by:	Alastair Ferrar
Position:	Senior Associate
Qualifications:	Chartered Landscape Architect CMLI, BL(hons) PrLArch

File name:	1878 SLVA 16 12 16.docx
Date issued:	16th December 2016
Checked by:	Sian Jones

CONTENTS

1	**INTRODUCTION**	**1**
2	**METHODOLOGY**	**2**
3	**EXISTING SITUATION**	**3**
3.1	Site Context	3
3.2	Planning Context	5
3.3	Landscape Character	8
3.4	Landscape Designations	16
3.5	Visual Resource	19
4	**THE PROPOSALS**	**23**
4.1	Introduction	23
4.2	General Principles of Development	23
4.3	Landscape Opportunities	25
5	**POTENTIAL LANDSCAPE AND VISUAL EFFECTS**	**28**
5.1	Introduction	28
5.2	Co-ordination with Masterplan	28
5.3	Potential Landscape Effects	31
5.4	Potential Visual Effects	31
6	**CONCLUSIONS**	**33**

APPENDIX A FIGURES 1 – 8:

FIGURE 1 SITE LOCATION

FIGURE 2 AERIAL PHOTOGRAPH

FIGURE 3 PUBLIC RIGHTS OF WAY

FIGURE 4 CULTURAL HERITAGE DESIGNATIONS

FIGURE 5 LANDSCAPE DESIGNATIONS

FIGURE 6 LANDSCAPE CHARACTER AREAS

FIGURE 7 PHOTOGRAPH LOCATIONS

FIGURE 8 LANDSCAPE OPPORTUNITIES AND CONSTRAINTS

APPENDIX B PHOTOGRAPHIC SHEETS (8 SHEETS)

APPENDIX C PUBLISHED LANDSCAPE CHARACTER ASSESSMENTS

APPENDIX D LIZ LAKE ASSOCIATES LVA METHODOLOGY

1 INTRODUCTION

1.1.1 This Strategic Landscape and Visual Assessment (SLVA) has been prepared by Liz Lake Associates on behalf of [redacted] to assess the landscape and visual issues relevant to a strategic development proposed at land at Woodlands Golf Course, Bristol (hereafter known as the Site).

1.1.2 The principal objective of the assessment is to identify the landscape and visual issues associated with the potential development site, identify the likely landscape and visual effects of the proposed development and guide an emerging masterplan that will show its capacity to accommodate development.

1.1.3 The report considers the existing baseline conditions and seeks to identify the relevant landscape and visual issues applicable to the Site. A SLVA has been undertaken to assess the potential effects upon the landscape resource, specific views and visual amenity.

1.1.4 An initial site visit was undertaken in November 2016 to review and appraise the context and surroundings. The assessment was made by a Chartered Landscape Architect. The weather was cool with full cloud cover and visibility was suitable.

1.1.5 All photographs were taken with a Canon EOS 400D digital camera, with a 30mm fixed lens. The 30mm lens is the digital equivalent to a standard 50mm focal length lens with a single lens reflex camera.

2 METHODOLOGY

2.1.1 This SLVA of the Site has been prepared, encompassing the 'Guidelines for Landscape and Visual Impact Assessment' (GLVIA) 3rd edition (published by the Landscape Institute and the Institute of Environmental Management and Assessment, 2013), and 'Landscape Character Assessment: Guidance for England and Scotland' (published by the Countryside Agency and Scottish National Heritage, 2002). In summary, the approach combines information and desktop reviews with on-site surveys and appraisal. The Liz Lake Associates LVA Methodology is included in Appendix C.

2.1.2 The site-based assessment involves the recording of both objective descriptions and subjective impressions of the landscape, as well as details of the existing landscape condition. It includes an assessment of the extent and nature of views to and from the Site and the types of receptors that experience these views.

2.1.3 The following relevant studies and documents have been considered as part of the desk-based review and subsequent assessment:

- Natural England – National Character Areas (2014);
- South Gloucestershire Landscape Character Assessment, Draft Proposed for Adoption 12 November 2014;

2.1.4 The site assessment was undertaken by Chartered Landscape Architect during daylight hours in late November 2016.

2.1.5 This study is based upon the red line identified by [redacted] and shown on Figure 1: Site Location (Appendix A).

2.1.6 This report should be read in conjunction with the following reports prepared by Liz Lake Associates: Landscape Sensitivity and Capacity Study for Woodlands Garden Village, December 2016; and Green Belt Assessment for Woodlands Garden Village, December 2016.

3 EXISTING SITUATION

3.1 Site Context

3.1.1 Bristol is the largest city in the South West of England. Strategically positioned on the mainline rail route between Wales and London, served by both the M4 and M5 motorways and with an international airport, the city is exceptionally well connected in transport terms.

3.1.2 The Site is located directly adjacent to the north eastern residential edge of Bristol. Approximately 112 hectares in size, it is bounded by Hortham Lane and a field boundary to the north, Trench Lane and the West Country Water Park to the south, the M4 and M5 to the west, and field boundaries to the east.

3.1.3 The majority of the Site is currently in sporting/leisure land use as Woodlands Golf and Country Club, extending to approximately 112 hectares and comprising two golf courses (The Signature Course and The Masters Course), together with a club house and areas of hardstanding for car and buggy parking. The Site features large scale earth mounds, particularly evident on along the western boundary when using the M4/M5 motorway junction, and an infrastructure of fairways, greens, bunkers and groups of trees, which retain some sections of the former hedgerow pattern.

3.1.4 The topography of the Site is manmade and complex, with a high point of approximately 70m AOD on the mounds along the western boundary, and a low point of approximately 50m AOD on the south eastern edge following Hortham Brook. The Site is physically and visually contained to the west, south west and north-west by very large earth mounds associated with the M4 and M5 motorways.

3.1.5 A managed hedgerow defines the northern boundary of the Site, beyond which Hortham Lane crosses over the M4 and provides access to the small agricultural hamlet of Gaunts Earthcott. A few individual dwelling houses are located along Hortham Lane within close proximity to the Site boundary with a small collection of farm buildings and the remains of an historic chapel along Gaunts Earthcott Lane a field boundary define the site boundary to the north, Trench Lane and the West

Country Water Park to the south, the M4 and M5 to the west, and field boundaries to the east.

3.1.6 The southern edge of the Site is defined in part by Trench Lane which extends in a north-west to south-east direction. The road is separated from the site by a narrow strip of native scrub. At the south east corner of the site the boundary is formed by a managed native hedgerow beyond which is variously a go kart circuit, a lake of recreational use and to the north western edge a solar photovoltaic array at Grange Court Farm.

3.1.7 Along the eastern edge of the site the line of hedgerow continues north to join the densely vegetated banks of Dockham Ditch and Hortham Brook. Beyond this, agricultural fields of managed pasture and meadow continue along the east and north east boundary until it meets Hortham Lane at the northern extent of the Site. The lane arcs around an approximate east west direction as it rises along a densely vegetated embankment above the site to cross the M5 motorway.

3.1.8 The motorway defines the north western edge of the Site separated from the golf course by a strip of dense scrub on engineered landforms that gradually rise toward the M4 motorway at Almondsbury interchange. At this western edge the landform is additionally separated from the motorway by a drainage ditch. The landform continues along the western edge toward Trench Lane broken only by a narrow gap for overhead power lines.

3.1.9 Whilst the landscape is lush, green and open in character, typical of a well managed golf course, the landscape is crossed by a network of overhead power cables that provides a noticeable sense of semi-industrial character to the skyline.

3.1.10 Although the Site is visually well contained by large earth mounds to the west, the fast moving vehicular traffic flowing along the M4 and M5 motorways beyond the earth mounds provides a constant audible presence across the full extent of the Site.

3.1.11 The Site boundary features are poorly defined by fragments of hedgerows and mature isolated trees. The remaining vegetation is defined by the course design and crossed with concrete and gravel tracks. In contrast, the Site boundaries to the north and

west are strongly defined by a series of earth mounds which rise steeply toward dense native tree and shrub cover.

3.1.12 The more rural of the surrounding land uses are either contained by long established agricultural field patterns or, as in the case of the golf course, the field pattern of hedgerows, trees and copses (including those features evident on historic maps from the 1880's) has been subsumed and significantly changed. This has resulted in an ornamental and recreational character, which contrasts strongly to the wider rural landscape. Large scale planting (not all of which is native or of local character) has been implemented as part of the golf course expansion, to integrate the new landforms and land use pattern within wider views. A woodland structure will continue to develop over time helping to provide screening and integration with the wider landscape, as well as increasing habitat value and diversity.

3.1.13 Adjacent land uses include the built-up areas on the urban edge of Bristol, immediately to the south-west of the Site, beyond the M4 motorway. Neighbouring the site on Trench lane to the south is West Country Water Park, an ad hoc development of buildings and earth mounds around a quarried lake. The lake, a running/cycle track and a karting track feature as recreational attractions within the complex. To the south-east of the Site immediately east of the water park is the large Grange Farm Solar Array.

3.2 Planning Context

A brief summary of national and local planning policies and guidance affecting the Site are outlined below for reference.

National Planning Policy Framework ('NPPF')

3.2.1 Paragraph 109 of the NPPF states that the planning system should contribute to and enhance the natural and local environment by *"Protecting and enhancing valued landscapes, geological conservation interests and soils"*

3.2.2 The NPPF does not define what is meant by 'valued landscapes', however the value of a landscape is explained in the Guidance for England and Scotland: *"Landscape Value is concerned with the relative value that is attached to different landscapes. In*

a policy context the usual basis for recognising certain highly valued landscapes is through the application of a local or national landscape designation. Yet a landscape may be valued by different communities of interest for many different reasons without any formal designation, recognising, for example, perceptual aspects such as scenic beauty, tranquillity or wildness; special cultural associations; the influence and presence of other conservation interests; or the existence of a consensus about importance either nationally or locally".

3.2.3 Local planning authorities should be encouraged to allocate *"land with the least environmental or amenity value, where consistent with other policies in this Framework"*, and set criteria based policies against which landscape areas will be judged, *"so that protection is commensurate with their status and gives appropriate weight to their importance and the contribution that they make to wider ecological networks"* considering not just networks of biodiversity but also green infrastructure.

Local Planning Policy and Guidance

3.2.4 The Site is situated within the boundaries of the South Gloucestershire Council under the planning guidance of the Local Plan 2006 and Core Strategy 2006-2027. Relevant extracts from policies within these documents are highlighted below:

3.2.5 Local Plan Policy L1 – Landscape Protection and Enhancement: *"In order that the character, distinctiveness, quality and amenity of the landscapes of south Gloucestershire are conserved and enhanced, new development will be permitted only where:*

a. those attributes of the landscape which make a significant contribution to the character of the landscape are conserved and where possible enhanced; and

b. those features in or of the landscape which make a significant contribution to the character or distinctiveness of the locality are retained, protected and managed in a manner which ensures their long-term viability; and

c. the amenity of the landscape is conserved and where possible enhanced."

"The council will seek to negotiate the provision of works to restore, maintain and where possible enhance the landscape in a manner which contributes to the

character, quality, distinctiveness and amenity of the locality within which the development is located.

In the context of a degraded landscape, or one where the character has been eroded, the council will expect the development to contribute to the regeneration and restoration of landscape character and distinctiveness as well as visual amenity."

3.2.6 Local Plan Policy L4 – Forest of Avon: *"Development that is permitted within the community forest area as defined on the proposals map should:*

a. respect the developing woodland setting; and

b. not conflict with the community forest objectives; and

c. not prejudice community forest projects.

In its consideration of applications within the forest of Avon the council will take account of the forest plan's strategies and the council will seek to negotiate a contribution towards the implementation of community forest objectives."

3.2.7 Local Plan Policy L13 – Listed Buildings: *"Development including alterations or additions affecting a listed building or its setting will not be permitted unless*

a. the building and its setting would be preserved; and

b. features of architectural or historic interest would be retained; and

c. the character, historic form and structural integrity of the building would be retained.

The council will expect proposals for development involving listed buildings to incorporate detailed measures for their preservation and, where relevant, achievable and desirable, enhancement."

3.2.8 Local Plan Policy GB1 – Development within the Green Belt states that *"any proposals for development within or conspicuous from the green belt which would have an adverse impact on the visual amenity of the green belt will not be permitted."*

3.2.9 Core Strategy Policy CS1 – High Quality Design: seeks to secure the delivery of high quality design while making reference to the need to take account of published Landscape Character Assessments.

3.2.10 Core Strategy Policy CS2 – Green infrastructure: *"The Council and its partners will ensure that existing and new Green Infrastructure (GI) is planned, delivered and managed as an integral part of creating sustainable communities and enhancing quality of life, considering… delivering high quality multi-functional and connected open spaces (including Green and Blue Infrastructure)… conserving and enhancing landscape character, historical, natural, built and cultural heritage features."*

3.2.11 Core Strategy Policy CS9 – Managing the environment and heritage: *"The natural and historic environment is a finite and irreplaceable resource. In order to protect and manage South Gloucestershire's environment and its resources in a sustainable way, new development will be expected to… conserve and enhance the character, quality, distinctiveness and amenity of the landscape… "*

3.2.12 Core Strategy Policy CS34 – Rural areas: *"Development plan documents and development proposals will take account of the vision for the rural areas and partnership priorities, accord with Neighbourhood Plan initiatives and will… protect, conserve and enhance the rural areas' distinctive character, beauty, wildlife, landscape, biodiversity and heritage."*

3.3 Landscape Character

3.3.1 Landscape considerations, as opposed to visual considerations, deal with the fabric, character and quality of the landscape. The fabric deals with the physical and cultural elements that make up the landscape, such as landform, features, land use as well as spiritual, perceptual and experiential factors. The way these elements all fit together in terms of proportion, pattern, scale, etc., gives rise to a particular landscape character. Changes to the fabric and character of a particular landscape may affect the perceived value of that landscape, giving rise to changes in its quality.

3.3.2 The following two sub-sections are a summary of available published landscape character assessments, firstly covering landscape character at the national level and then at the local, or district level.

National Landscape Character Areas:

3.3.3 Natural England has prepared National Character Area profiles for 159 National Character Areas across the UK. The Site is located in National Character Area profile (118) Bristol, Avon Valleys and Ridges as defined by Natural England. Key characteristics of the area relevant to this Site include:

- *"Low-lying, shallow vales that contrast sharply with high, open downland ridges as the varied landform reflects the complex underlying geology…*
- *The River Avon cuts a steep-sided valley through the area from the east, forming the 2.5 km long, c.100 m high gorge at Bristol. It is joined by the Frome at the centre of Bristol and the Chew near Keynsham.*
- *The most extensive areas of woodland lie between Congresbury and the Avon Gorge and on the Failand Ridge. These are internationally significant, containing rare endemic whitebeam species. Elsewhere, woodlands are smaller and fragmented and mainly confined to steeper land; the majority are broadleaf.*
- *Agriculture is predominantly livestock rearing, with arable in the flatter land to the north-east, with larger field sizes and infrequent hedgerow trees.*
- *Settlements dating from the medieval period, clustered around springheads of the Cotswold scarp or along the springline of the Mendips. In the vales they are scattered, linked by a complex network of lanes, with linear mining villages superimposed. Settlement becomes especially dense in the southeast, with many villages enlarged as commuter settlements.*
- *Older village buildings, gentry houses and mansions of local ashlar, which includes pale yellow Jurassic oolitic limestones and grey Carboniferous and Lias limestones. Red or brown sandstone is used in the north, and Pennant Sandstone at Nailsea 'Flats' in the south-west.*

- *Bristol and its commercial, industrial and residential areas; major roads (M4 and M5 motorways); the airfields (Filton and Bristol); and reservoirs, which occupy a substantial area around Bristol. There is considerable commercial development around Cribbs Causeway, Aztec West and Abbey Wood."*

County/ District Character Areas:

3.3.4 In addition to the landscape character profiles available at a national level, county and district councils regularly update more detailed character assessments to assist in more localised decision making. The Site is within the boundaries of the South Gloucestershire Landscape Character Assessment area, and more specifically at the south west corner of the Earthcott Vale (10) area, and at the convergence of the following areas: Patchway & Filton (15); Rudgeway & Tytheington Ridge (17); and Severn Ridges (18).

3.3.5 The Earthcott Vale (10) landscape character area is characterised by gently undulating agricultural fields, divided by a complex network of hedgerows, trees and lanes. The key characteristics of this area relevant to the Site are:

- *"Gently undulating shallow vale with low ridges to the east at Latteridge Hill, The Marle Hills and Winterbourne, with small scale valleys to the south and small plateau area to the south west.*
- *Land cover of medium to small sized regular or irregular shaped pasture and arable fields, with some enlarged fields to the west.*
- *Fields are bordered by hedgerows that provide connectivity of habitat, varying from thick, clipped to overgrown or intermittent in places, with dense riparian vegetation in the south.*
- *The area is dissected by a number of watercourses with associated bankside vegetation that provide habitat and wildlife corridors for a range of species.*
- *Pennant sandstone walls define some fields and lanes near Winterbourne and Frampton Cotterell, with more limited limestone or Pennant sandstone walls associated with properties and settlement elsewhere.*

- *Broadleaf woodland is relatively limited with a few areas scattered around the west, including one with standing water. Mature hedgerow trees are frequent in the north and west and variable elsewhere.*

- *Settlement is limited, with traditional scattered farms, houses & hamlets, largely built of limestone in the west and Pennant sandstone in the east, associated with the narrow minor roads/lanes, which cross and intersect the area.*

- *Winterbourne Church and Court form a local landmark and North Woods Park has a local influence within a small valley, both to the south of the area.*

- *Winterbourne and Frampton Cotterell settlement edges define sections of the area's boundary. Bradley Stoke and the Bristol urban edge beyond the character area have some visual influence over the south western landscape.*

- *The south west has a concentration of recreational land use comprising a golf course, water sports, rugby ground and horse paddocks.*

- *Traffic on the M4 motorway and associated infrastructure has a local effect in this area.*

- *Land raising operations adjacent to the M4/M5 interchange and along the M4 corridor have formed significant man-made landforms, some with artificial profiles covered by rough grassland or scrub.*

- *Numerous powerlines and associated pylons cross the area and are visible horizontal and vertical elements. They converge on the Iron Acton sub-station to the north east.*

- *This character area includes the site of South Gloucestershire's first consented wind farm, proposed to comprise three 100m tall turbines to be located to the northeast of Earthcott Green and west of the Iron Acton Substation."*

3.3.6 The Site abuts two additional character areas of Patchway & Filton (15) and Rudgeway & Tytheington Ridge (17). These areas are characterised by a mix of urban

fringe residential and semi-industrial landscapes, segregated out-of-town residential developments, as well as gently undulating agricultural fields, divided by a complex network of hedgerows, trees and lanes. The key characteristics of these areas relevant to the Site are:

3.3.7 Patchway & Filton (15). The key characteristics of this area relevant to the Site are referred to as *"largely built up… bounded by motorways to the north west and north east, with railway lines and roads dividing the area. Road network and high traffic levels are prominent features.*

The assessment also refers to "*more recent residential development occurs on fringes of an older housing core, and towards the M4 boundary, comprising uniform estates, with strategic landscape infrastructure"*

3.3.8 Rudgeway & Tytheington Ridge (17). The key characteristics of this area relevant to the Site are *"broad linear ridgeline, with ridge/plateau and gentle slopes to the east, seen as a backdrop to the vale and plain beyond. …open to semi-enclosed predominantly pastoral landscape of regular, medium sized fields with a mix of thick, clipped and intermittent hedges and stock fencing.*

Extensive road pattern of M5, M4/M5 interchange and A38 define this area. …settlement is limited, with small villages/hamlets and ribbon settlement along roads."

3.3.9 Descriptions of the Site are found within the Earthcott Vale (10) section of the landscape character assessment. Extracts of particular relevance to this assessment have been underlined below:

"*Woodlands Golf Course and recent extension covers an extensive area and comprises an open to semi-enclosed landscape of mown fairways, new mound landform and linear tree planting (ornamental in places), visually contained to the south, west and north west by very large earth mounds. The existing course is partly visible from roads along its boundary and within middle distance views from higher ground beyond this area to the north west.*

Within the Golf Course, the former agricultural field pattern has generally been restructured, with the loss or severance of some hedgerows, although isolated

remnants of overgrown hedgerows and copses have been retained within parts of the golf course layout. Hortham Brook retains sections of its dense tree and scrub riparian vegetation. Land raising, in association with the golf course and elsewhere, has had a significant impact on local landscape character:

Existing earth mounding along the west and southern boundary of the golf course has produced a large scale, steep profiled landform, forming an artificial skyline and, covered by rough grassland, scrub, and developing tree cover, atypical of the surrounding landscape. This feature is highly prominent from the motorway interchange and its approaches. However, it is not particularly evident from within this character area, other than in local views and, it screens the M4/M5 interchange and dense commercial development of Almondsbury Business Park within the adjacent area."

3.3.10 Each character area contains a section referring to how the landscape is changing over time. For Earthcott Vale (10) this is described as a *"rural agricultural landscape with limited dispersed settlement, but which is subject to a range of significant pressures and changes that affect the landscape character… The existing landscape framework of hedgerow and tree structure throughout the landscape character area is generally intact and in a relatively good condition. However, the following variations are evident:*

- *Within the small stream valleys to the south and areas closer to Winterbourne, hedgerows are not actively managed, resulting in the development of tall overgrown hedgerows to fields and dense shrubs and trees along watercourses.*

- *The mature hedgerow tree and woodland structure throughout the area has few juvenile trees present to sustain the succession and therefore the framework in the long term. The decline of these features would significantly change the character and biodiversity value of the area.*

- *The recreational facilities in the south west of the character area have evolved within both a former agricultural landscape and one small former quarry site."*

3.3.11 Land uses in the south-west of the character area, in the vicinity of the golf course, such as the recreational facilities and the solar array, have evolved within a former

agricultural landscape and, *"are either contained by the original hedgerow pattern or, as in the case of the golf course, the agricultural pattern of hedgerows, trees and copses has been subsumed and often significantly changed. This has produced an ornamental character within these sites which is different to the wider rural landscape."* In addition the following elements noted within the character assessment are relevant to the golf course and its context:

- *"… large scale native planting has been implemented as part of the golf course expansion, to integrate the new landforms and land use pattern within wider views. A woodland structure will develop over time helping to provide screening and integration with the wider landscape as well as habitat value.*

- *The hedgerows which presently contain these sites are largely overgrown, helping to screen these areas. However, without active management/ replanting, these hedgerows will decline in the long term, increasing the prominence of these recreational landscapes and their contrast with adjoining rural areas, primarily within local views.*

- *The erosion of the landscape framework within the area as a whole could raise the visual prominence of a number of built features which are currently well integrated. This would include the Iron Acton sub-station, pylons and powerlines to the north of the area, the settlement edge of Frampton Cotterel and Winterbourne to the south east, the limited scattered settlement pattern elsewhere and the Grange Solar Farm.*

- *Land raising has introduced new, unnatural landforms and poorer quality soils which, without adequate maintenance, result in weed encroachment and visually different grassland to adjacent agricultural land. Some areas planted with trees will, in the long term, result in woodland cover, which will help to reduce the impact of the landform and contribute to the vegetation structure and Forest of Avon objectives in the area.*

- *A number of mobile phone masts along the motorway corridor have introduced new skyline features, evident from adjacent rural areas and the M4. The proliferation of these masts is a recent development trend, introducing new structures to often rural, elevated and consequently visible locations."*

Contribution to Local Landscape Character

3.3.12 The South Gloucestershire LCA (Earthcott Vale 10) describes the Site as *"an open to semi-enclosed landscape of mown fairways, new mound landform and linear tree planting (ornamental in places). Water bodies, new and mature planting, fragmented hedgerow remnants, copses."*

3.3.13 At a local scale, the Site is situated immediately adjacent, and to the north of, the M4/M5 motorway junction on the northern fringe of Bristol. The motorway junction follows the edge of the Green Belt and consequently forms a clearly noticeable line between the built development of the outer Bristol fringes and the more open and semi-rural areas to the north.

3.3.14 The Site, abutting the edge of Bristol's Green Belt, is sandwiched between the agricultural landscape to the north and the urban fringe landscape to the south, but is characterised by neither of these.

3.3.15 Whilst the Site is within the Earthcott Vale (10) area, its current use as a golf course could be considered of similar sporting and recreational use to some surrounding land uses i.e. water sports, carting, rugby grounds and horse paddocks, however it is not typical of the surrounding landscape character. There are however some attributes on the edges of the Site, e.g. field boundary hedgerows and the vegetation along watercourses, that are representative of the local landscape character. The Site, therefore, provides a limited contribution to the character of the Earthcott Vale character area. Despite its partial openness, it could potentially be more readily associated with the character of the more urban landscape to the south, given the lack of agricultural characteristics and features typically associated with the rural landscape.

3.3.16 Due to its pleasant and well managed appearance, which is largely ornamental, as well as having some attributes representative of the local landscape character and

use (i.e. surrounding recreational and sporting facilities, hedgerows, etc.) the dominating features are incongruous elements associated with the golf course. Overall, however, the Site does not overtly detract from the local landscape character.

3.4 Landscape Designations

3.4.1 Many sensitive landscapes across the UK are subject to a range of statutory or non-statutory protection by means of formal designations. These designations vary in purpose and function, and include planning, ecological, social/cultural and heritage related functions.

3.4.2 **Green Belt:** The Site is located within the Bristol and Bath Green Belt, on its southern edge. Green Belt designations have a planning related function and are regulated by planning policy and therefore have limited relevance in relation to assessment of landscape character or visual amenity.

3.4.3 **Area of Outstanding Natural Beauty (AONB):** The Cotswolds AONB is located approximately 10km to the east of the Site and therefore beyond the limits of its influence.

3.4.4 **Conservation Areas and Listed Buildings**: There are no Conservation Areas or buildings that are listed on the Historic England register within the Site, however, one Conservation Area and a number of Listed Buildings are located within the 2km study area (refer to Figure 3, Cultural Heritage Designations), these include:

3.4.5 On the western edge of the study area and to the west of the motorway junction situated on lower ground is the Lower Almondsbury Conservation Area and a number of associated listed buildings. These include the Cottage Hospital and Institute, the Pear Tree Cottage and Boundary Wall and the Almondsbury War Memorial.

Evaluation: Due to the elevation of the motorway junction between the Site and the Conservation Area and raised mounding on the western boundary of the Site, it is unlikely that it would be within the visual influence of the Site and equally its setting is unlikely to be affected by potential development on the Site. Refer to Viewpoint 05.

3.4.6 The hamlet of Gaunts Earthcott to the north of the Site consists of a chapel ruin and a group of farm houses on two farms, Green Farm and Court Farm. Both Green Farmhouse (1312947) and Court Farmhouse (1128865) are listed Grade II on the Historic England register. On the western edge of the hamlet is the Manor House (1128866), listed Grade II* with associated wall and gate piers.

Evaluation: Due to the proximity of these buildings from the Site they may be within its visual influence and equally their setting may be affected by potential development on the Site. Refer to Viewpoint 09 and 10 taken from the roadside and footpath to the south of Gaunts Earthcott respectively.

3.4.7 Located approximately 1km to the east of the Site, directly to the north of the Grange Hotel and set on a raised ridgeline is a grouping of privately owned dwellings understood to be a former asylum. The associated buildings include Northwood House (1136122), Matford House (1128974) and Calebs Herridges Seymour House Sherbourne (1128975), all listed Grade II on the Historic England register.

Evaluation: Due to the proximity of these buildings from the Site and their elevated position on a ridgeline, they may be within its visual influence and equally their setting may be affected by potential development on the Site. No photographic viewpoints are available from this location.

3.4.8 To the north of the former asylum, set on lower ground to the east of the ridgeline, is Gloucester Road Farm with a Grade II listed Barn (1128976) located approximately 20m north of the farm house.

Evaluation: Due to the elevation of the ridge between the Site and Barn it is unlikely that it would be within the visual influence of the Site and its setting is unlikely to be affected by potential development on the Site.

3.4.9 To the north-west, on the outer edge of the study area near Earthcott Green, are a cluster of Grade II listed buildings associated with Earthcott Green Old Farm. These include the Old Green Farmhouse (1128882) and Barn (1136322). Not far from this location is Brook Cottage (1136316). Approximately 600m west of this location is Angers Farmhouse and stable (1321101).

Evaluation: Due to the distance between the Site and these buildings and the screening effects of intervening vegetation it is unlikely that they would be within the visual influence of the Site and equally their setting is unlikely to be affected by potential development on the Site. Refer to Viewpoint 10 (Appendix B).

3.4.10 Over 1km north of the Site, beyond the M5 motorway, to the south of Rudgeway and behind a low ridgeline is the Grade II listed Tockington Park Farmhouse (1321064), a privately owned dwelling.

Evaluation: Due to the distance between it and the Site, and the combined screening effects of the ridge and intervening woodland (Tockington Park Wood and Hortham Wood) it is unlikely that it would be within the visual influence of the Site and equally their setting is unlikely to be affected by potential development on the Site.

3.4.11 **Scheduled Monuments:** There are no Scheduled Monuments within the Site or within the 2km study area. The closest Scheduled Monument is the ruin of St Helen's Church, Rudgeway (1007011) approximately 2.1km north of the Site. (refer Figure 4, Cultural Heritage Designations).

3.4.12 **Registered Parks and Gardens:** There are no listed parks and gardens within the Site or the 2km study area. The closest scheduled landscape is Grade II listed Stoke PARK (1000129), approximately 5km south of the Site. (refer to Figure 4, Cultural Heritage Designations).

3.4.13 **Public Rights of Way (PROW)**: There are no national trails within or immediately adjacent the Site, however the Community Forest Path which links to the Frome Valley Way extends through the Three Brooks Nature Reserve to the south of the M4 motorway. A number of secondary Public Rights of Way (including public footpaths and bridleways) are located on or within close proximity of the Site boundaries. (refer to Figure 3, Public Rights of Way).

Evaluation: Due to the elevation of this footpath on the valley bottom, intervening vegetation, residential buildings and motorway, it is unlikely that the Community Forest Path would be within the visual influence of the Site and equally their setting is unlikely to be affected by potential development on the Site. A limited number of

secondary footpaths and bridleways on and immediately adjacent the Site would be within its visual influence and equally their setting may be affected by potential development on the Site. Refer to Viewpoint 10 (Appendix B) from the local footpath to the south of Gaunts Earthcott.

3.5 Visual Resource

3.5.1 The Site is located on the outer edge of Bristol abutting the M4/M5 motorway junction on its western boundary. It is visually contained by artificially raised earth mounds associated with the motorway and golf course, the motorway infrastructure, surrounding development and surrounding belts of vegetation.

3.5.2 A range of visual receptors were identified within a 2km radius of the Site. These include, people using Public Rights of Way (e.g. walking, cycling or on horse-back on footpaths, byways or bridleways), people residing in dwellings or using facilities associated with areas of residence, and motorists using roads.

3.5.3 A series of key viewpoints were selected as being representative of the visual receptors as identified above. The locations of these are illustrated on Figure 07.

Views from the North and East

3.5.4 The hamlet of Gaunts Earthcott, located less than half a kilometre from the north-eastern Site boundary, includes a few heritage assets in the form of privately owned listed buildings and structures (refer to 3.4.6 above). At the south of the hamlet, a public footpath extends from the Chapel ruin in a short loop, within close proximity of the Site boundary.

3.5.5 Viewpoints 08, 09 and 10 illustrate nearby views of the Site from the north and east towards the golf course and the developed areas of Aztec West and Patchway beyond the motorway junction. These views would be experienced by residents of the private dwellings on the southern edge of Gaunts Earthcott, users of the public footpath to the south of the hamlet and by motorists using the road.

3.5.6 Whilst these views contain some typical elements of rural character in the foreground, such as agricultural land and managed hedgerows, they also contain

elements that relate to the urban fringe of Bristol in the middle distance and background, such as the motorway, electricity pylons, the golf course and its backdrop of built development.

3.5.7 The Site is partly exposed to viewpoints from the north and east primarily due to the close proximity of the selected viewpoints and the lack of intervening landscape features as exists to the west of the Site.

3.5.8 Further out, towards the edge of the 2km study area views towards the Site become more rural in character and more typical of the descriptions within the published character assessments. Viewpoint 11 and 12 illustrate that, other than the influence of the overhead electricity pylons, the views are of a rural character and more typical of the Earthcott Vale character area. Views of the Site, however, are not evident from these locations.

Views from the South

3.5.9 The southern boundary of the Site is formed by Trench Lane, a short section of the M4 motorway, West Country Water Park and the solar photovoltaic array at Grange Court Farm. Beyond the line of the M4 motorway, Bradley Stoke and Patchway/ Aztec West form a dense grain of built development that surrounds the Three Brooks Nature Reserve. The Community Forest Path, a well used footpath, extends along the length of the reserve following the course of Patchway Brook on the valley bottom.

3.5.10 Viewpoint 03 and 04 are taken from the Community Forest Path looking north towards the Site and would be experienced by people walking the route. The view at 03, from within the nature reserve, is a view of the area within the reserve, constrained by foreground trees, the rising ground of the valley and residential development beyond. The sound of the motorway is also clearly audible from this location.

3.5.11 View 04 is from an elevated position on a footbridge over Bradley Stoke Way and the brook. The view north towards the Site is dominated by residential development and despite the elevated position, neither the Site nor the motorway are visible from this location.

3.5.12 Immediately adjacent the Site to the south, Viewpoints 01 and 02 are taken from Trench Lane towards the north. These views would be experienced by motorists using the road and by recreational users of the water park. View 01 is from raised ground on the road bridge over the motorway. The Site is partly visible through a dense thicket of trees and scrub dominating the foreground view. During the summer months when the trees are in leaf, there would be no view available of the Site from this location.

3.5.13 From the entrance gate of the West Country Water Park (Viewpoint 02), views are available of the recreation facility which includes a lake and associated buildings towards the west. The view is dominated by the lake in the foreground. Views of the Site are available on the skyline above low trees and a hedgerow on the northern boundary of the water park.

Views from the West and North-West

3.5.14 The motorway junction and the M5 corridor define the western and north-western boundary of the Site. Within the Site, on its western edge, large artificial mounds create a distinct separation between the Site and the motorway junction.

3.5.15 The settlement of Almondsbury, located approximately 1km to the West of the Site, is on lower ground, orientated towards the north-west, on the slopes of the Severn valley. Viewpoint 05 represents views that could be experienced from people in dwellings on the edge of the settlement facing south-east.

3.5.16 The view appears partly rural in character, however the middle distance view of the RAC tower and the clear sound of the motorway indicate its proximity to the developed fringe of Bristol. Despite its proximity, the Site is not visible from the south-eastern edges of Almondsbury.

3.5.17 Horsham Wood, immediately north-west of the Site and the M5 motorway and Tockington Park Wood, located on a low ridgeline, provide a visual screen from most locations north-west of the Site.

3.5.18 A relatively new residential development at Colony Farm is located approximately 200m to the north of the motorway junction and Site boundary. Views towards the south-east from this location (Viewpoint 06), experienced from and around these

dwellings, are on lower ground and overlook the motorway. The raised mounds on the western Site boundary are visible on the skyline in the background view beyond the motorway.

3.5.19 Further north, on the ridge at the edge of Tockington Park Wood (Viewpoint 07), the view, experienced by people walking on the footpath, opens across agricultural fields and over the motorway with the golf course visible beyond. A similar view may be experienced from small upper floor windows of the dwellings that face south, above back garden fences. The electricity pylons are dominant in the view from this location and the motorway is clearly visible in the middle distance.

Visual Evaluation

3.5.20 The Site is generally well contained from surrounding views due to the combined effects of land form, motorway infrastructure, landscape features and built development.

3.5.21 The Site is most exposed on its northern and north-eastern boundaries. However, views onto the Site from the north and east, which includes areas around Gaunts Earthcott, are restricted to a limited number of locations within approximately 1km of the Site.

3.5.22 Although these views from areas around Gaunts Earthcott are limited and localised, they are of good visual amenity, where the quality of the existing views are such that there are few incongruous elements and the views are enjoyed by local people on a day to day basis (refer to viewpoints 08 to 11).

3.5.23 From the majority of locations around the Site, views are of fair visual amenity, where the quality of existing views is such that there are a number of incongruous elements and local people are generally more likely to be indifferent to the view.

4 THE PROPOSALS

4.1 Introduction

4.1.1 This review and assessment has been made on the basis that a proposed development would comprise a 'typical' residential development of predominantly two storey with some three storey dwellings, including areas of public open space, recreation and play space, and sustainable drainage provision. Supporting infrastructure such as primary schools and a local centre will also be included.

4.1.2 Developing design proposals would take guidance from planning policy and published landscape character assessments as well as from a detailed knowledge of the Site, its physical and visual context, and its landscape opportunities and constraints.

4.1.3 The landscape opportunities and constraints plan (Figure 8) has been prepared to inform the development of the Site masterplan. Refer to sections 4.3 and 5.2 below for further detail and elaboration on the potential landscape opportunities and development guidelines for the Site.

4.2 General Principles of Development

4.2.1 As discussed in section 3.2 above, policy CS1 of the South Gloucestershire Core Strategy seeks to secure the delivery of high quality design while making reference to the need to take account of published Landscape Character Assessments.

4.2.2 Each individual Character Area Profile of the National Character Areas (NCA) published by Natural England includes a number of Statements of Environmental Opportunity (SEO). For the Bristol, Avon Valleys and Ridges (Area 118), SEO1 discusses the importance of conserving and managing "*the distinction between small rural settlements and the densely urban city of Bristol, the urban fringe transition zone and the commuter settlements*; and also to *"ensure that new development is sensitively designed to contribute to settlement character, reduce the impact of the*

urban fringe and provide well-designed green infrastructure to enhance recreation, biodiversity and water flow regulation."

4.2.3 Each character area as described in the South Gloucestershire LCA includes high level strategic guidance on the future evolution of the character area. For Earthcott Vale (Area 10) the Landscape Strategy highlights the importance of *"succession planting of broadleaf woodland, parkland and hedgerow trees as well as at the settlement edges is necessary to sustain the differing characters of the character area into the future, and to maintain and enhance biodiversity value…"*and to *"ensure the existing habitat resource is retained as a diverse mosaic of grasslands and woodlands with connectivity through wildlife corridors such as hedgerows.*

4.2.4 In terms of provision of green infrastructure, the assessment goes on to state that, *"robust planting schemes should be implemented as part of any development*, *…along with long term management and maintenance plans in order to maximise the integration of these developments into the surrounding landscape, and to avoid erosion of the character and biodiversity value of the rural landscape",* and the importance of *"retention and active management of hedgerows to help to ensure the conservation of these key landscape and biodiversity features for the long term …this is particularly pressing in the south where the erosion of the landscape structure is extending the urbanising influence of adjacent settlement and the motorway into the Earthcott Vale area."* It goes on to state that the *"replacement of hedges by fencing …should be resisted due to its erosion of landscape character and potential loss of habitat value and connectivity."*

4.2.5 In terms of new road construction, the assessment states that, "any new highway works should seek to protect and incorporate traditional landscape features or replace them where necessary, so that the rural character of the road network is retained."

4.2.6 The design of proposed development would therefore need to be well integrated into the landscape and maintain the subtle qualities of the transition between the

developed fringes of Bristol and the rural landscape to the north. The treatment of the Site edge, particularly to the north and east, and the strategy for new on-site green infrastructure, will be important to maintaining and enhancing the quality of that transition.

4.3 Landscape Opportunities

4.3.1 To assist the design process, the following landscape opportunities could be applied to the emerging site masterplan based upon the findings of site investigations, visual effects considerations, and information taken from planning policy guidance and published landscape character assessments:

- new development to respond to existing surrounding landscape features and patterns as well as historic settlement and landscape patterns and makes reference to local landscape character;
- development is well integrated into the landscape and not visually prominent, particularly in relation to views from areas around Gaunts Earthcott to the north-east of the Site;
- promote creative expression and innovation in the design of new landscapes and buildings providing they are appropriate in terms of scale and character of the landscape, utilise local materials and planting species;
- urban greening to ensure the urban environment is best able to adapt to the potential effects of climate change, through the introduction of street trees, SuDS, and a robust network of green infrastructure on the Site and connecting to adjacent sites;
- provide high quality, multi-functional greenspace associated with areas of new development, delivered through an enhanced landscape management regime that delivers biodiversity benefits, and alleviates pressures on surrounding sites.

- enhance the wooded character of the landscape by promoting the creation of new woodlands which would involve natural regeneration of trees typical of the area including oak, ash, hazel and birch;
- promote introduction of native and ecologically beneficial species including hawthorn, holly, field maple and other species, which are appropriate to landscape character;
- provide high quality, multi-functional greenspace associated with areas of new development, delivered through an enhanced landscape management regime that delivers biodiversity benefits, and alleviates pressures on surrounding sites.
- ensure appropriate management through natural regeneration, control of non-native species and reintroduction of coppicing as a management tool for neglected woodlands and hedgerows; and
- provide inclusive access for all by incorporating good connectivity and movement opportunities through and across the Site.

4.3.2 With thoughtful and well-considered design of the Site layout, using a clear strategy for green infrastructure as a starting point, the approach to landscape enhancement and mitigation could include:

- enhancement of existing hedgerow vegetation along Site boundaries to reinforce and strengthen the character of the surrounding landscape;
- reinstatement of hedgerows which have been removed or lost over time, due to the use of the Site as a golf course;
- potential to create new native, species rich, woodland belts within the Site and along Site boundaries for public use, to integrate the Site into the surrounding landscape;
- retain and enhance water features as storm drainage and attenuation features across the Site, in accordance with Site conditions and engineering constraints; and

- creation of strategic areas of open, amenity and recreational space to be used by residents and the wider community, linked with a network of paths connecting the Site to the neighbouring areas and anchoring it into the wider landscape.

4.3.3 Due to the proximity of the Site to the more rural landscape to the north and east, appropriate consideration should be given to redefining or enhancing these boundary features, and ensure development in the northern part of the Site is of an appropriate scale and layout to minimise effects on the surrounding landscape.

4.3.4 Proactive implementation of these opportunities and guidelines listed above would provide significant benefits for the Site and wider district, whilst meeting the council's aims in relation to green infrastructure, landscape character and visual amenity, as well as related benefits such as access, movement and connectivity, sustainability, open space and recreation.

5 POTENTIAL LANDSCAPE AND VISUAL EFFECTS

5.1 Introduction

5.1.1 Proposed development on the Woodlands Golf Course site to provide a sustainable Garden Village, adjacent to the Almondsbury motorway interchange, would form an extension to the urban fringe of Bristol. The current sporting/ leisure use of the Site as a golf course would be transformed into a high quality residential neighbourhood with connecting roads, a local centre and a network of accessible, connected green spaces. The landscape infrastructure would incorporate a series of undulating mounds, trees and water features associated with its former use as a golf course which will ensure it is well integrated into the surrounding landscape at an early stage.

5.1.2 The presence of existing elements, such as major transportation routes (audible and visible motorways) directly adjacent the Site, the presence of overhead power lines, mobile phone masts and motorway gantries, detract from the contribution the Site makes to the character of the wider landscape. In addition, the Site's current use as a golf course is not in keeping with the character of the surrounding landscape.

5.1.3 The ability of the Site to absorb change will be subject to consideration of the extent of visual enclosure of the Site, the surrounding landscape features and vegetation that contributes to screening views, as well as perceived value of the landscape as it exists in its current form.

5.2 Co-ordination with Masterplan

5.2.1 During the preparation of this document, an iterative process has taken place between the project team to ensure the masterplan has been informed by the findings of this study. The following is a summary of the advice provided to the masterplanning team.

5.2.2 Green infrastructure and access:

- Consideration of linked green infrastructure, drainage and connectivity (walking and cycling) across the Site should inform the arrangement of the layout at the earliest stage of the project;
- The Brook and Ditch to the east of the Site are key landscape features, and their influence on the proposals should be maximised, particularly in relation to SuDS, green infrastructure, biodiversity, recreation, amenity and access;
- The potential for the introduction of blocks of native broadleaf woodland should be explored within the buffer areas/boundaries as an opportunity for visual mitigation and contribution to landscape character;
- Proposals should demonstrate improved access and connectivity within the Site and to surrounding areas by exploiting connections to existing rights of way surrounding the Site; and
- Existing native hedgerows should be retained and strengthened or enhanced where possible.

5.2.3 Views:

- The Site is visually well contained, primarily due to the influence of the motorways and the engineered mounds on the western boundary, but also because the majority of the Site is not exposed on raised ground, nor is it overlooked by viewpoints on surrounding ridges; and
- The most sensitive views of the Site are from around Gaunts Earthcott at the north-east of the Site, from Hortham Lane, Gaunts Earthcott Lane and the surrounding farms and public footpaths, and therefore visual mitigation should account for this, particularly on the northern and eastern Site boundaries.

5.2.4 Site heritage:

- When considering potential landscape effects and enhancements, it would be beneficial to understand the Site in terms of its historic development and attempt to recapture some of the historic field boundaries that would have existed before the golf course was introduced; and
- Similarly, the position of the historic settlement that once existed on the site is an opportunity that should be considered as a guide to locating the existing local centre and movement routes.

5.2.5 Building heights:

- It would be appropriate, from the perspective of landscape character and views, to propose 2 storey dwellings across the majority of the site, possibly slightly taller more in some areas;
- Taller properties (possibly 2.5 or 3 stories) could potentially exist on lower ground in order to free up space for green infrastructure and visual mitigation in areas to the north of the Site;
- Buildings associated with the local centre could afford greater density and height which could be mitigated using intervening green corridors and the surrounding slightly lower built form;
- Slightly greater building heights height could potentially exist comfortably along much of the central spine road if the buildings are orientated to face the road (albeit possibly set back); and
- Reduced density and building heights should be considered to the north and the south-eastern pocket of the Site in order to ensure that visual effects are mitigated from the north and east in particular.

5.3 Potential Landscape Effects

5.3.1 According to the GLVIA 3, an assessment of landscape effects *"deals with the effects of change and development on landscape as a resource."*

5.3.2 The implementation of residential development on the Woodlands site would result in a direct change in the character of the landscape on the Site resulting from its change in use from sport/leisure to residential with associated open space. The contained nature of the Site, which is bordered by large scale infrastructural and urban fringe development on its western and southern edges, and more rural arable farmland bounded by hedgerows towards the north and east, means that the Site has limited influence in the wider landscape, most likely resulting in limited potential landscape effects on the surrounding landscape resource.

5.3.3 The landscape resource of the Site is considered to be of **medium/low susceptibility** to the effects of development. This is defined as a damaged or robust landscape where appropriate change can be absorbed and could contribute to the restoration of key characteristics, individual elements or features and specific aesthetic or perceptual aspects or, overall local landscape character.

5.4 Potential Visual Effects

5.4.1 Views across the Site from within its boundaries are relatively long and expansive, interrupted by numerous incongruous elements that are not typical of the local landscape character, e.g. mown fairways, bunkers and buggy paths, manufactured earth mounds, overhead power lines and mobile phone masts, the motorway and associated infrastructure. Occasional features and elements are visible that are more typical of surrounding landscapes like hedgerows and trees, towards the edges of the Site. Views out of the Site are relatively well contained by the combined effects of these features.

5.4.2 Dwellings immediately to the north of the Site along Gaunts Earthcott Lane, (viewpoint 09) and users of public footpaths immediately to the north (viewpoint 10), are some of the more sensitive visual receptors that would also be likely to experience the most harmful visual effects. If landscape mitigation and enhancement measures are thoughtfully incorporated into the design in the northern parts of the

Site, it would be possible to mitigate potential localised significant visual effects from areas surrounding Gaunts Earthcott.

5.4.3 Further away from the Site, potential views of the development may also be glimpsed through gaps between hedgerows and trees on the edge of Tockington Park Wood to the north-west of the Site (viewpoint 07) and possibly from dwellings on Tockington Farm itself although likely to be partly obscured by the intervening Tockington Park Wood and low ridgeline. Dwellings at the eastern end of Woodhouse Ave and along South Road (to the south-west of Tockington Park Wood) have back gardens and play areas facing the Site and could potentially offer views of the Site from second storey windows and communal play areas. It is however unlikely that any views from this residential area would experience significant effects from development on the Site if appropriate mitigation measures are implemented.

5.4.4 The provision of a generous landscape buffer and green corridor along the boundary to the motorway, incorporating the raised mounds, would provide substantial softening of views from the north-west and could potentially provide an enhancement of the views from these areas (refer to viewpoints 06 and 07) as existing incongruous elements would be removed from view.

5.4.5 Viewpoint 06 towards the Site from the relatively recent residential development of Hortham Village on the north side of the motorway junction offers nearby direct views of the motorway from south facing properties and play areas. Beyond the motorway views of the raised earth mounds on the Site boundary are available but it is unlikely that any significant effects of development on the Site would be perceived from this location.

5.4.6 The only other potential visual effects worth noting in this assessment are those from immediately to the south of the Site, from Trench Lane and the West Country Water Park, however there would be no sensitive receptors in these locations so any visual effects are unlikely to be significant from these locations (viewpoints 01 and 02).

6 CONCLUSIONS

6.1.1 The Strategic Landscape and Visual Assessment has provided a review of the existing landscape and visual resources of Woodlands Golf Course (the Site) and its wider landscape context in consideration of potential development. This assessment considers views within a 2km study area including settlement edges, dwellings, roads and footpaths, including views from within the Site.

6.1.2 The Site currently functions as a golf course, situated on the edge of the urban fringe of Bristol, alongside the M4/M5 motorway junction, and is considered to make a limited contribution to the local landscape character and offer good visual amenity from areas to the north and east of the Site and fair visual amenity from most other surrounding areas. The change of use from sporting/ leisure to a residential development would be unavoidable and direct.

6.1.3 The landscape resource of the Site is considered to be of medium/low susceptibility to the effects of development due to its ability to incorporate change that could contribute to the restoration of landscape features and elements on Site.

6.1.4 Some of the more sensitive visual receptors that would be likely to experience the most harmful visual effects would be those dwellings immediately to the north of the Site along Gaunts Earthcott Lane and users of public footpaths immediately to the north of the Site, however, it would be possible to reduce these potential localised effects with appropriate mitigation. The footpaths within the Site are also likely to experience significant visual effects from potential development on Site.

6.1.5 Proactive implementation of the recommended opportunities and guidelines contained within this study would provide significant benefits for the Site and wider district, whilst meeting the council's aims in relation to green infrastructure, landscape character and visual amenity, as well as related benefits such as access, movement and connectivity, sustainability, open space and recreation.

6.1.6 With a thoughtful and creative approach to design, and landscape and visual issues driving design decisions, the proposed development could provide a positive contribution to the landscape character of the Site and most surroundings areas.

Stansted:
Unit 1, The Exchange,
9 Station Road, Stansted, CM24 8BE

t +44 (0)1279 647044
e office@lizlake.com
www.lizlake.com

Bristol:
1 Host Street,
Bristol, BS1 5BU

t +44 (0)117 927 1786

Nottingham:
Sutton Place, 49 Stoney St,
Nottingham NG1 1LX

t +44 (0)115 784 3566

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS

- Landscape Design
- Urban Design
- Residential
- Public Realm
- Masterplanning
- Landscape Planning
- Heritage Landscapes
- Gardens and Estates
- Restoration and Conversion
- Places of Worship
- Expert Witness
- Hospitality
- Education
- Retail / Office
- Community
- Ecology
- Arboriculture
- 3D / Graphic Design

Appendix A

WOODLANDS GARDEN VILLAGE, BRISTOL

STRATEGIC LANDSCAPE AND VISUAL ASSESSMENT

FIGURES 1 - 8

December 2016

FIGURE 1: SITE LOCATION

FIGURE 2: AERIAL PHOTOGRAPH

FIGURE 3: PUBLIC RIGHTS OF WAY

FIGURE 4: CULTURAL HERITAGE DESIGNATIONS

FIGURE 5: LANDSCAPE DESIGNATIONS

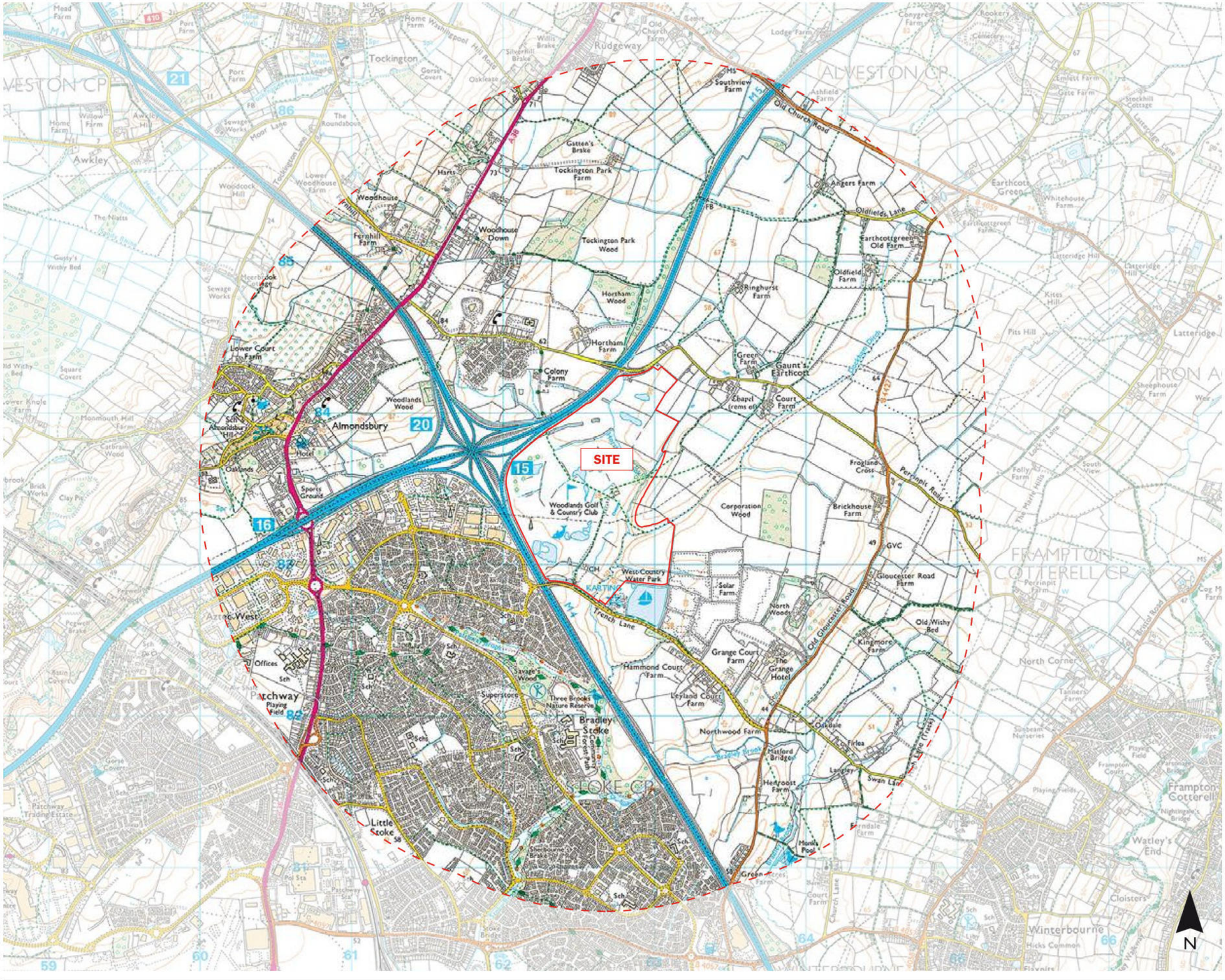
FIGURE 6: LANDSCAPE CHARACTER AREAS

FIGURE 7: PHOTOGRAPH LOCATIONS

FIGURE 8: LANDSCAPE OPPORTUNITIES AND CONSTRAINTS

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS
office@lizlake.com www.lizlake.com

Figure 1
Site Location


SITE
Rudgeway
Tockington
Awkley
Almondsbury
Patchway
Bradley Stoke
Little Stoke
Frampton Cotterell
Winterbourne
Tockington Park Farm
Tockington Park Wood
Woodlands Golf & Country Club
Corporation Wood
Hortham Wood
Hortham Farm
Ringhurst Farm
Oldfield Farm
Earthcott Green
Gaunt's Earthcott
Court Farm
Brickhouse Farm
Gloucester Road Farm
Kingmore Farm
Grange Court Farm
The Grange Hotel
Hammond Court Farm
Leyland Court Farm
Northwood Farm
Hernroost Farm
Ferndale Farm
Angers Farm
Southview Farm
Old Church Road
Oldfields Lane
Earthcott Green Old Farm
Latteridge
Pits Hill
Kites Hill
Latteridge Hill
Woodlands Wood
Colony Farm
Lower Court Farm
Woodhouse
Woodhouse Down
Ferrnhill Farm
Gatten's Brake
Harts
Oakdale
Firlea
Matford Bridge
Langley
Swan Lane
Trench Lane
Old Gloucester Road
Perrinpit Road
Frogland Cross
Old Wishy Bed
North Woods
Solar Farm
West Country Water Park
Three Brooks Nature Reserve
Superstore
Offices
Oaklands
Hotel
Sports Ground
Almondsbury Hill
Sch
Chapel (rems of)
GVC
North Corner
Watley's End
Cloisters
Frampton Court
Sheephouse Farm
Lodge Farm
Ashfield Farm
Emlett Farm
Gate Farm
Stockhill Cottage
Whitehouse Farm
Earthcottgreen Farm
Conygre Farm
Rookery Farm
Cemetery
Old Withy Bed
Square Covert
Gorse Covert
Catbrain Wood
Moorbrook
Sewage Works
Moor Lane
Tockington Lane
Woodcock Hill
The Roundabout
Home Farm
Port Farm
Willow Farm
Awkley Hill
The Platts
Gusty's Withy Bed
Patchway Trading Estate
Playing Field
Pool Sta
Brook Works
Clay Pit
Pegwell Brake
Gorse Covert
Monmouth Hill Farm
Lower Knole Farm
Brook
Sandpit
Quarry
Tanners Farm
Sunbeam Nurseries
Playing Fields
Nightingale's Bridge
Folly Farm
South View
The Marsh Hills
Perrinpit Farm
Cog Moor Farm
Court Lane
Church Lane
Hicks Common
Flaxpits
Aztec West
ALVESTON CP
FRAMPTON COTTERELL CP
BRADLEY STOKE CP
IRON A
M4
M5
A38
A4174
A4032
A4032 (Track)
Gaunts Earthcott Brook
Bradley Stoke
Footpath
KARTING
CH
FB
Pol Sta
Sch
Schs
Hotel
Offices
Superstore
Playing Field
Playing Fields
Sports Ground
Nature Reserve
Footpath
Track
Brook
Stream
Quarry
Pit
Works
Farm
Wood
Woods
Down
Hill
Lane
Road
Bridge
Court
Manor
Grange
Hotel
Cemetery
Rems of
Chapel
Pool
Meadow
Meadows
Gardens
Nursery
Nurseries
Estate
Trading Estate
Golf & Country Club
Water Park
Nature Reserve
Playing Field
Playing Fields
Sports Ground

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS
office@lizlake.com www.lizlake.com

Figure 2
Aerial Photograph



Legend

Site boundary

Project: Woodlands Golf Course, Bristol

Client: [redacted]

Date: December 2016

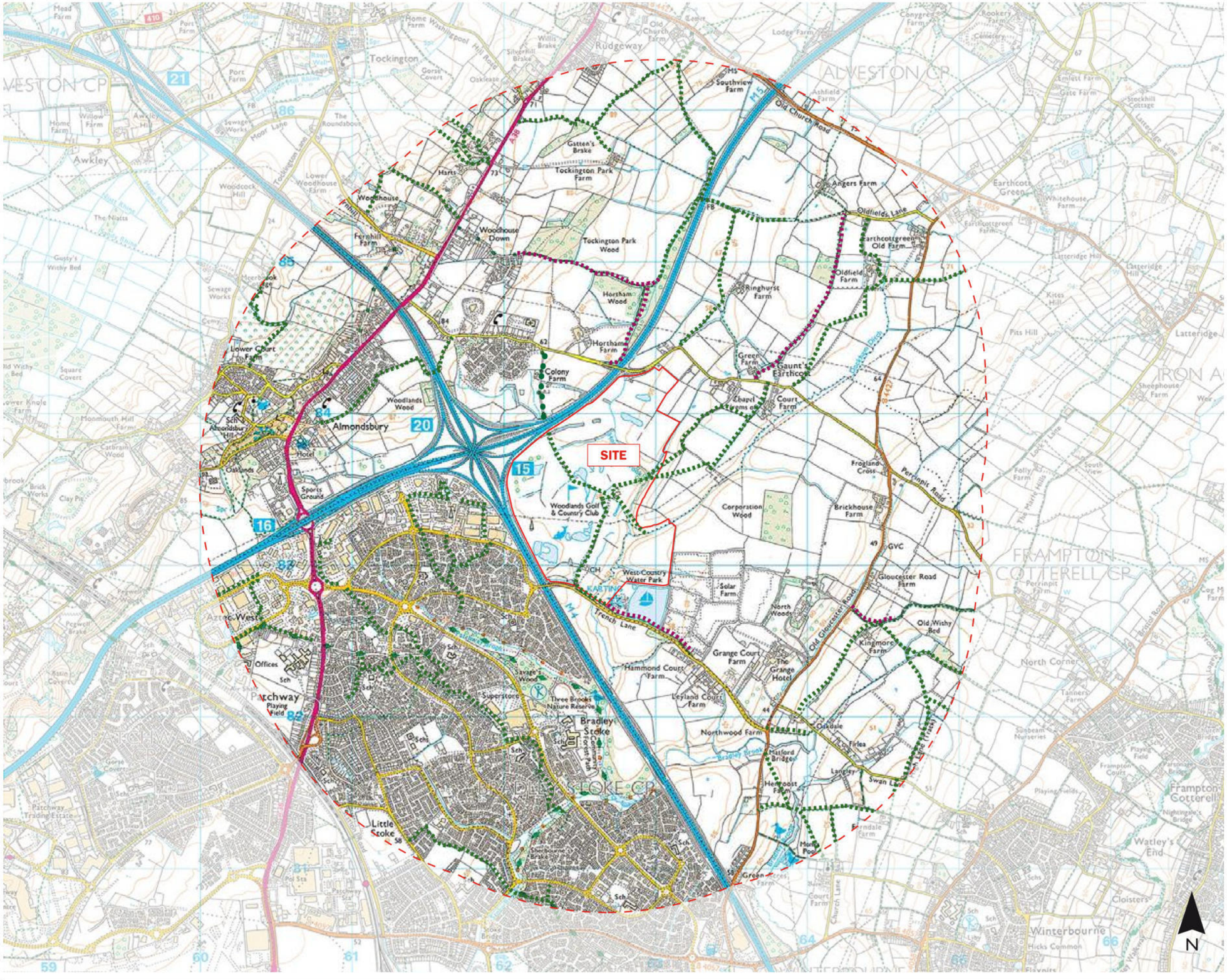
Scale: 1:25,000 @ A3

Status: Planning

© COPYRIGHT LIZ LAKE ASSOCIATES Reproduced from Ordnance Survey map data by permission of Ordnance Survey © Crown copyright 2016 Licence No.100007196
© Crown copyright and database rights 2016 Ordnance Survey Licence No.0100031673

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS
office@lizlake.com www.lizlake.com

Figure 3
Public Rights of Way



Legend

- Site boundary
- 2km extent of study area

Public Rights of Way:

- Public footpath
- Public bridleway
- Other route with public access

Project: Woodlands Golf Course, Bristol

Client: [redacted]

Date: December 2016

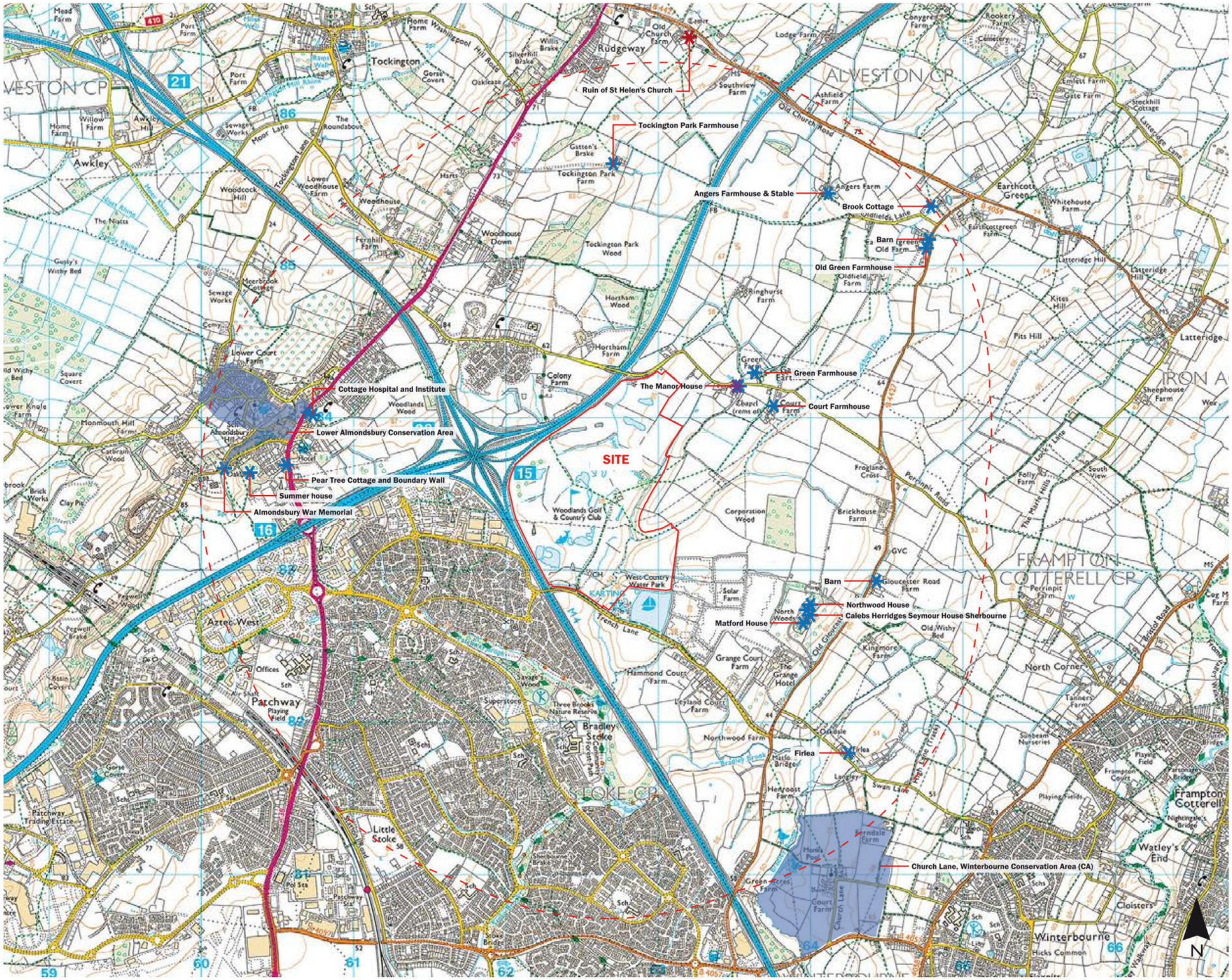
Scale: 1:25,000 @ A3

Status: Planning

© COPYRIGHT LIZ LAKE ASSOCIATES Reproduced from Ordnance Survey map data by permission of Ordnance Survey © Crown copyright 2016 Licence No.100007196
© Crown copyright and database rights 2016 Ordnance Survey Licence No.0100031673

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS
office@lizlake.com www.lizlake.com

Figure 4
Cultural Heritage Designations



Legend

- Site boundary
- 2km extent of study area
- Conservation Area (CA)
- Grade II* Listed Building outside Conservation Area (Total 1)
- Grade II Listed Building outside Conservation Area (Total 12)
- Scheduled Monument

Listed Buidlings within Lower Almondsbury Conservation Area:

Grade I	1
Grade II	16

Listed Buidlings within Church Lane, Winterbourne Conservation Area:

Grade I	1
Grade II*	1
Grade II	5

Project: Woodlands Golf Course, Bristol

Client: [redacted]

Date: December 2016

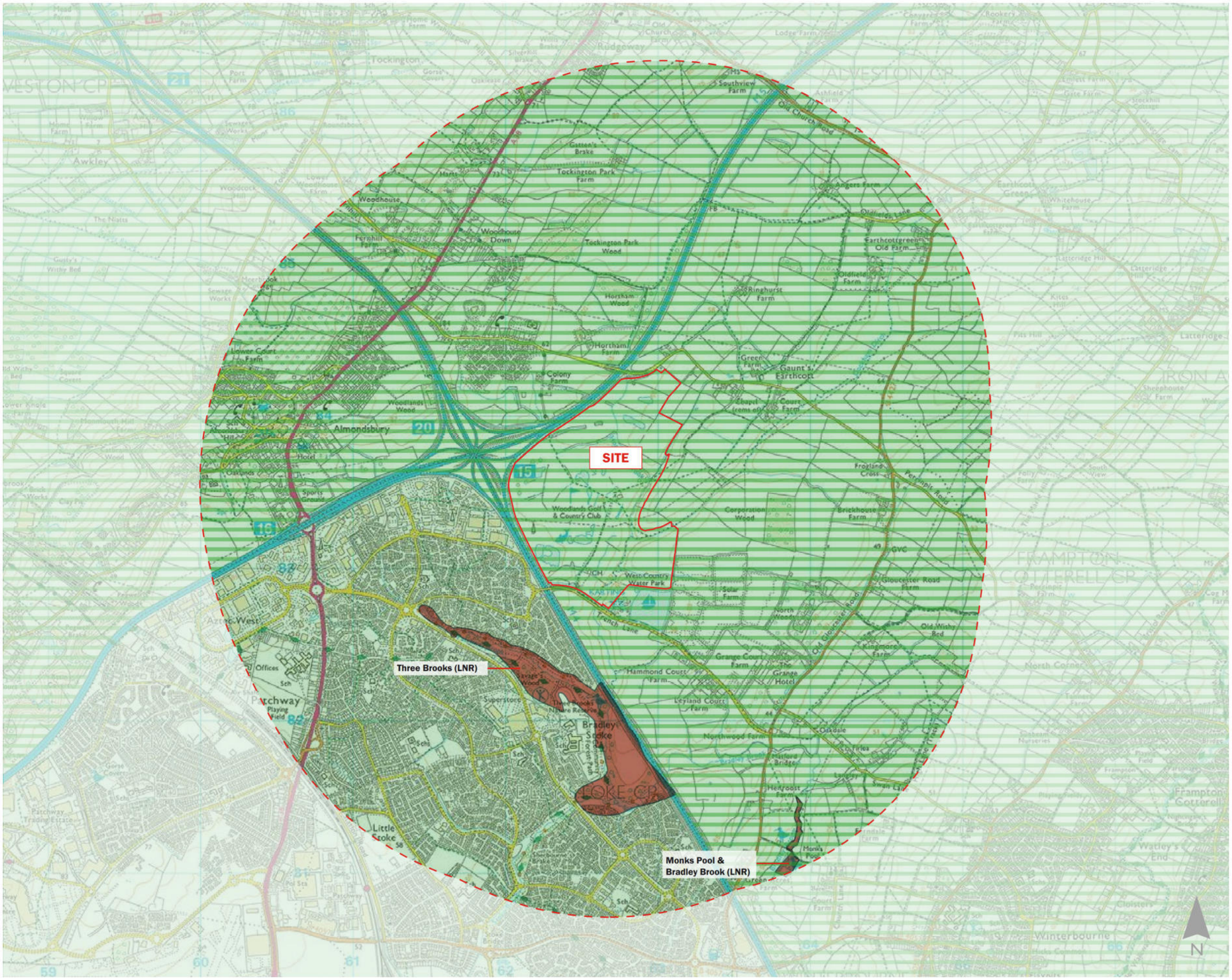
Scale: 1:25,000 @ A3

Status: Planning

© COPYRIGHT LIZ LAKE ASSOCIATES Reproduced from Ordnance Survey map data by permission of Ordnance Survey © Crown copyright 2016 Licence No.100007196
© Crown copyright and database rights 2016 Ordnance Survey Licence No.0100031673

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS
office@lizlake.com www.lizlake.com

Figure 5
Landscape Designations



Legend

- Site boundary
- 2km extent of study area
- Local Nature Reserve (LNR)
- Bristol Greenbelt
- Avon Community Forest

Project: Woodlands Golf Course, Bristol

Client: [redacted]

Date: December 2016

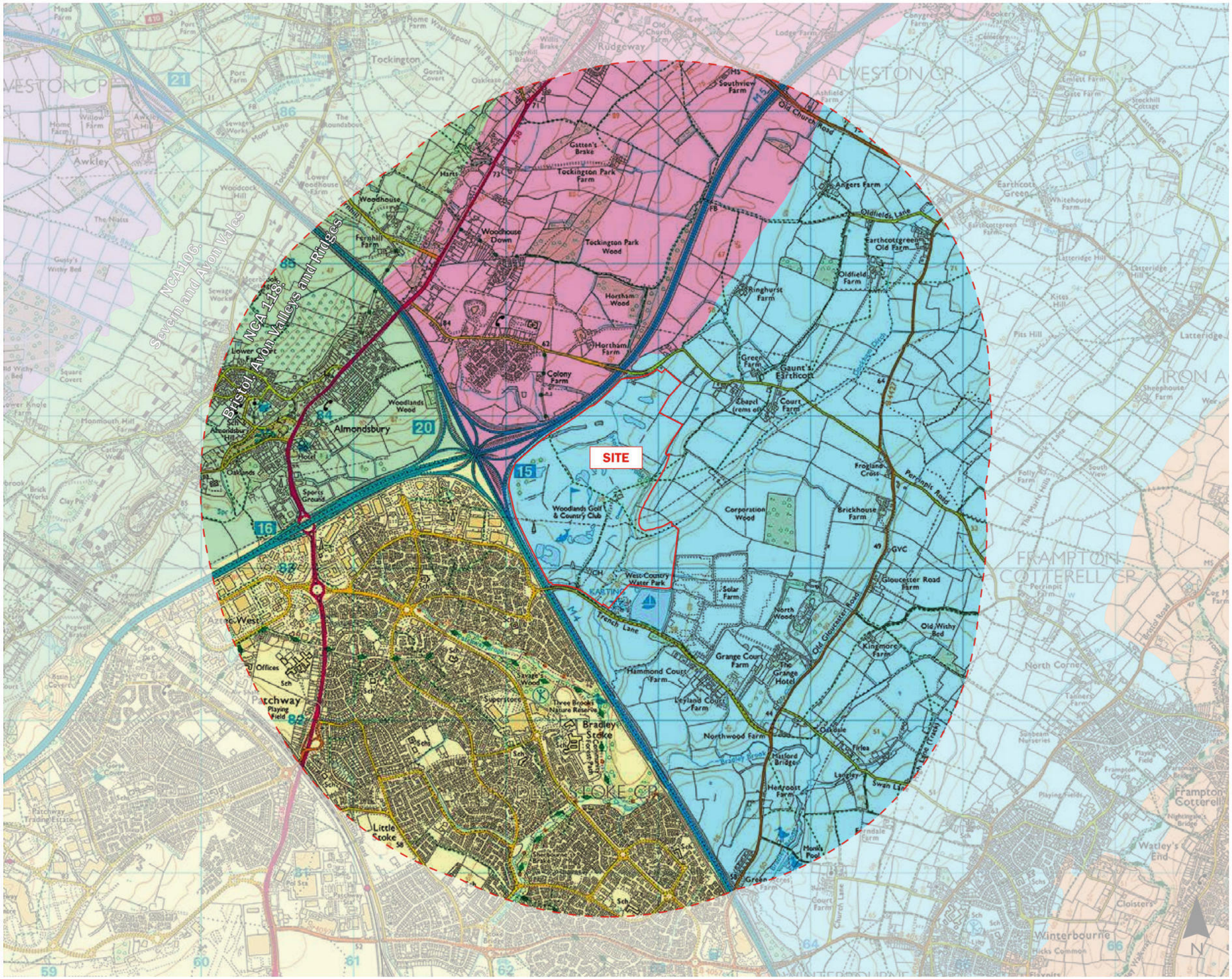
Scale: 1:25,000 @ A3

Status: Planning

© COPYRIGHT LIZ LAKE ASSOCIATES Reproduced from Ordnance Survey map data by permission of Ordnance Survey © Crown copyright 2016 Licence No.100007196
© Crown copyright and database rights 2016 Ordnance Survey Licence No.0100031673

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS
office@lizlake.com www.lizlake.com

Figure 6
Landscape Character Areas



Legend

Site boundary

2 km extent of study area

South Gloucestershire Landscape Character Assessment (2013) Landscape Character Areas:

Severn Ridges (18)

Patchway & Filton (15)

Earthcott Vale (10)

Rudgeway & Tytherington Ridge (17)

Project: Woodlands Golf Course, Bristol

Client: [redacted]

Date: December 2016

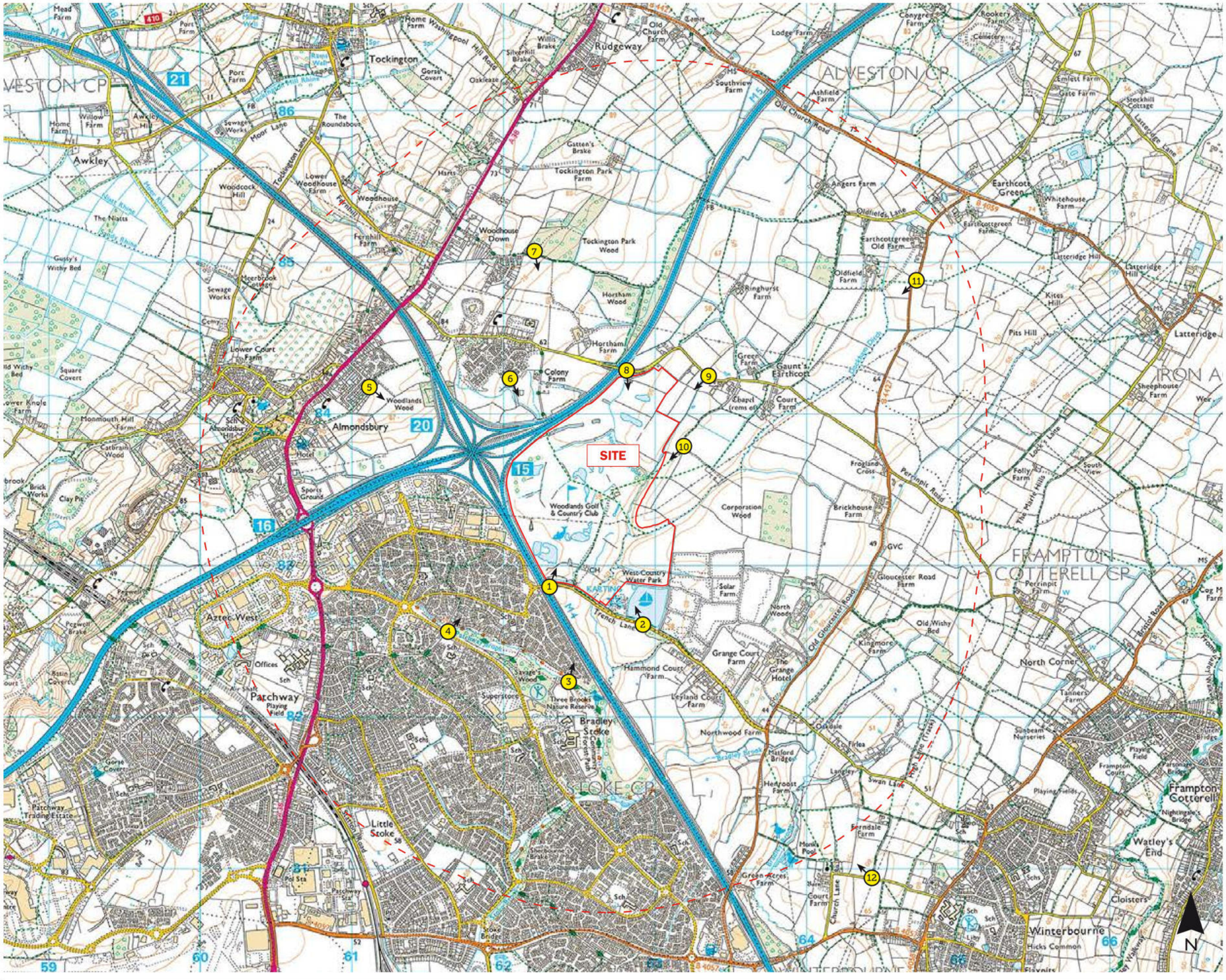
Scale: 1:25,000 @ A3

Status: Planning

© COPYRIGHT LIZ LAKE ASSOCIATES Reproduced from Ordnance Survey map data by permission of Ordnance Survey © Crown copyright 2016 Licence No.100007196
© Crown copyright and database rights 2016 Ordnance Survey Licence No.0100031673

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS
office@lizlake.com www.lizlake.com

Figure 7
Photograph Locations



Legend

- Site boundary
- 2 km extent of study area
- Photograph location and direction

1. View from Trench Lane
2. View from the West Country Water Park entrance gate
3. View from Three Brooks Nature Reserve
4. View from footbridge over Bradley Stoke Way
5. View from Florence Park, Almondsbury
6. View from Dogwood Road play area
7. View from south-west corner of Tockington Park Wood
8. View from Hortham Lane bridge
9. View from Gaunt's Earthcott Lane
10. View from footpath near Site boundary
11. View from Old Gloucester Road
12. View from Church Lane

Project: **Woodlands Golf Course, Bristol**

Client: [redacted]

Date: **December 2016**

Scale: **1:25,000 @ A3**

Status: **Planning**

© COPYRIGHT LIZ LAKE ASSOCIATES Reproduced from Ordnance Survey map data by permission of Ordnance Survey © Crown copyright 2016 Licence No.100007196
© Crown copyright and database rights 2016 Ordnance Survey Licence No.0100031673

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS

e office@lizlake.com www.lizlake.com

Figure 8

Landscape Opportunities and Constraints



Reference to historic places e.g. farms/hamlets

Existing water bodies to retain/reshape

Accessible public open space

Existing engineered mounds to retain/reshape

Native woodland buffer and visual screening

Potential footpath links

Potential development area

Green routes (to possibly follow historic field boundaries)

N

© COPYRIGHT LIZ LAKE ASSOCIATES Reproduced from Ordnance Survey map data by permission of Ordnance Survey
© Crown copyright 2015 Licence No.100007196
© Crown copyright and database rights 2015 Ordnance Survey Licence No.0100031673

Project: **Woodlands Garden Village** | Client: [redacted]
Date: **December 2016** | Scale: **NTS** | Status: **PLANNING**

Stansted:
Unit 1, The Exchange,
9 Station Road, Stansted, CM24 8BE

t +44 (0)1279 647044
e office@lizlake.com
www.lizlake.com

Bristol:
1 Host Street,
Bristol, BS1 5BU

t +44 (0)117 927 1786

Nottingham:
Sutton Place, 49 Stoney St,
Nottingham NG1 1LX

t +44 (0)115 784 3566

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS

- Landscape Design
- Urban Design
- Residential
- Public Realm
- Masterplanning
- Landscape Planning
- Heritage Landscapes
- Gardens and Estates
- Restoration and Conversion
- Places of Worship
- Expert Witness
- Hospitality
- Education
- Retail / Office
- Community
- Ecology
- Arboriculture
- 3D / Graphic Design

Appendix B

WOODLANDS GARDEN VILLAGE, BRISTOL

STRATEGIC LANDSCAPE AND VISUAL ASSESSMENT

PHOTOGRAPHIC SHEETS

December 2016

PHOTOGRAPHIC SHEETS (8 SHEETS)



Photo Location 1: View east towards Site. Taken from Trench Lane.



Photo Location 2: View north-west towards Site. Taken from the entrance gate to The West Country Water Park.



Photo Location 3: View north-east towards Site. Taken from Three Brooks Nature Reserve

© COPYRIGHT LIZ LAKE ASSOCIATES Reproduced from Ordnance Survey map data by permission of Ordnance Survey © Crown copyright 2015 Licence No.100007196
© Crown copyright and database rights 2015 Ordnance Survey Licence No.0100031673







© COPYRIGHT LIZ LAKE ASSOCIATES Reproduced from Ordnance Survey map data by permission of Ordnance Survey © Crown copyright 2015 Licence No.100007196
© Crown copyright and database rights 2015 Ordnance Survey Licence No.0100031673

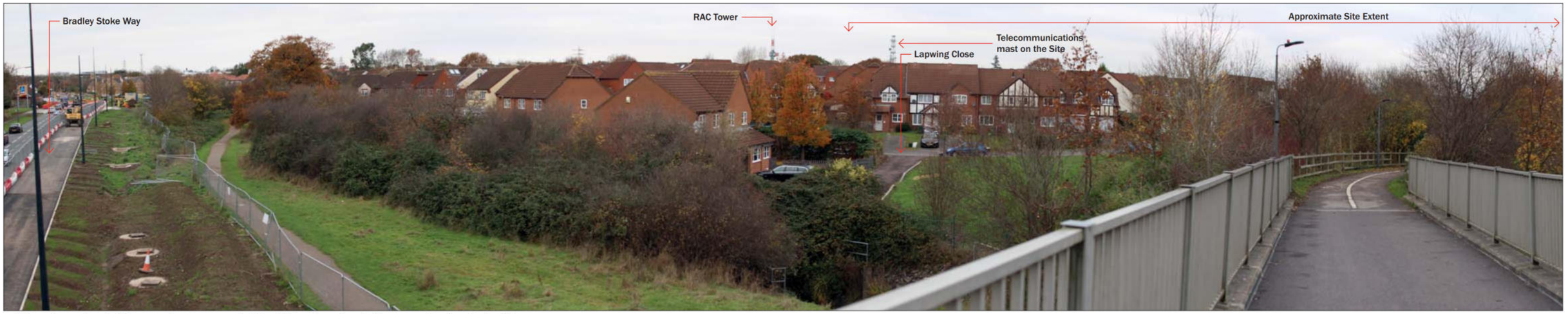


Photo Location 4: View north-east towards Site. Taken from footbridge over Bradley Stoke Way.

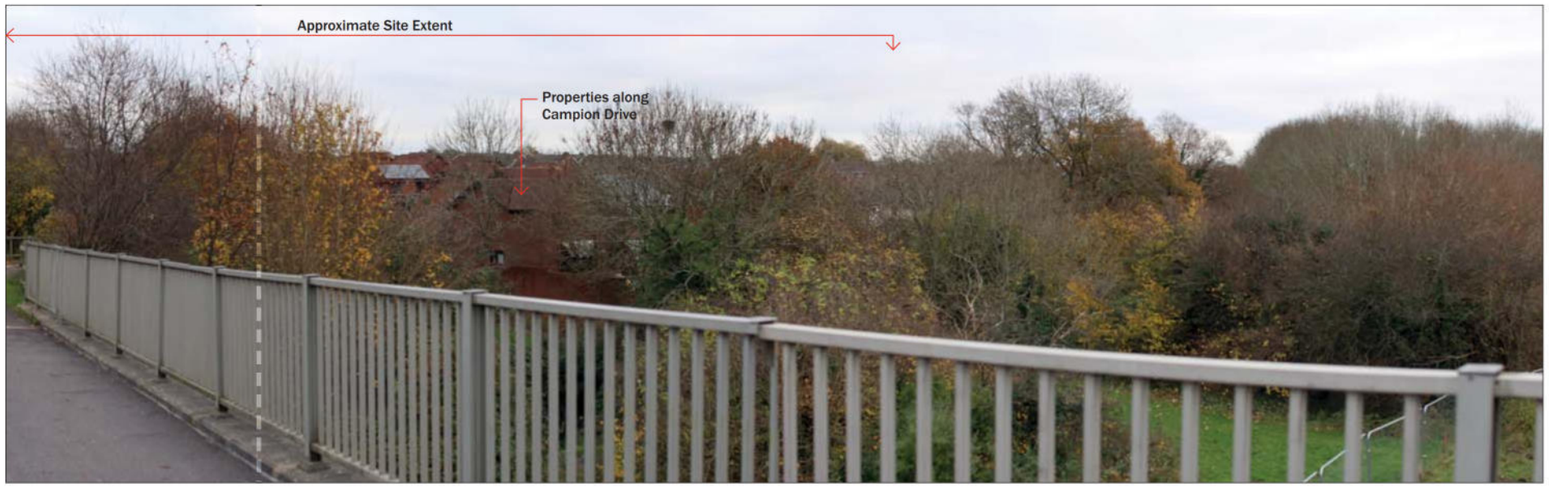


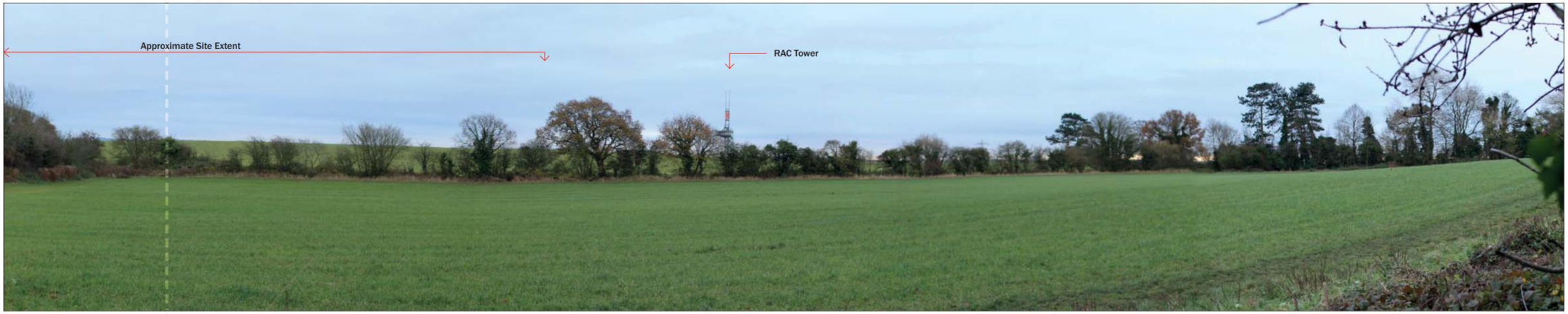
Photo Location 5: View south-west towards Site. Taken from Florence Park, Almondsbury.



Photo Location 6: View south-west towards Site. Taken from Dogwood Road play area.

© COPYRIGHT LIZ LAKE ASSOCIATES Reproduced from Ordnance Survey map data by permission of Ordnance Survey © Crown copyright 2015 Licence No.100007196
© Crown copyright and database rights 2015 Ordnance Survey Licence No.0100031673







© COPYRIGHT LIZ LAKE ASSOCIATES Reproduced from Ordnance Survey map data by permission of Ordnance Survey © Crown copyright 2015 Licence No.100007196
© Crown copyright and database rights 2015 Ordnance Survey Licence No.0100031673

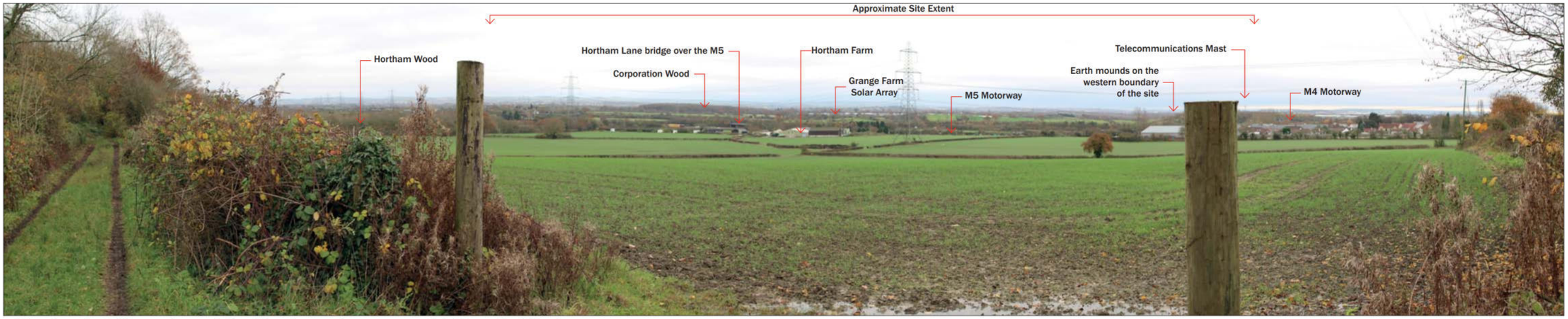


Photo Location 7: View south towards Site. Taken from south-west corner of Tockington Park Wood.

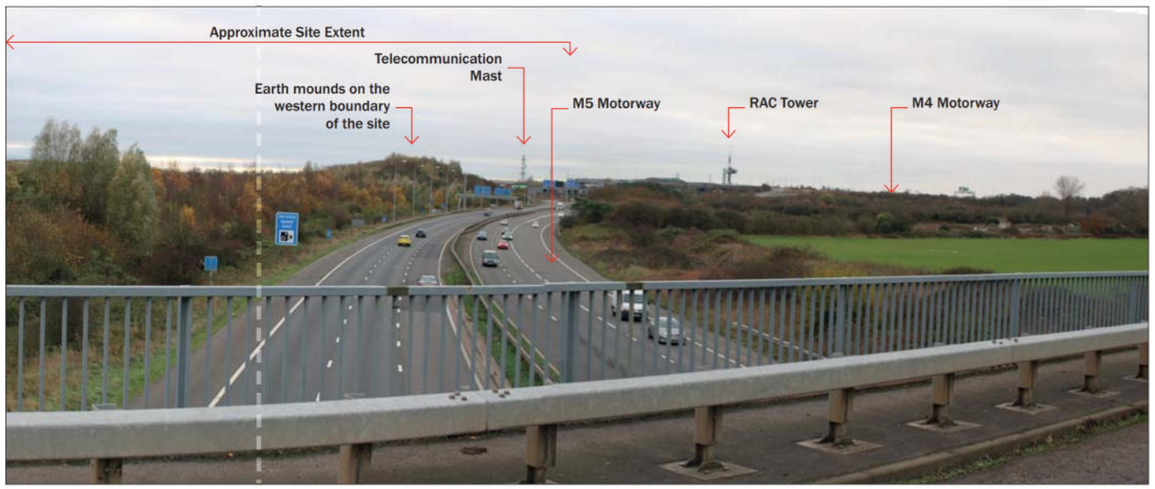


Photo Location 8: View south towards Site. Taken from Hortham Lane bridge over the M5.



Photo Location 9: View south west towards Site. Taken from Gaunt's Earthcott Lane.

© COPYRIGHT LIZ LAKE ASSOCIATES Reproduced from Ordnance Survey map data by permission of Ordnance Survey © Crown copyright 2015 Licence No.100007196
© Crown copyright and database rights 2015 Ordnance Survey Licence No.0100031673





© COPYRIGHT LIZ LAKE ASSOCIATES Reproduced from Ordnance Survey map data by permission of Ordnance Survey © Crown copyright 2015 Licence No.100007196
© Crown copyright and database rights 2015 Ordnance Survey Licence No.0100031673



Photo Location 10: View east towards Site. Taken from footpath near to site boundary.



Photo Location 11: View south-west towards Site. Taken from Old Gloucester Road (B4427).



Photo Location 12: View north-west towards Site. Taken from Church Lane.

© COPYRIGHT LIZ LAKE ASSOCIATES Reproduced from Ordnance Survey map data by permission of Ordnance Survey © Crown copyright 2015 Licence No.100007196
© Crown copyright and database rights 2015 Ordnance Survey Licence No.0100031673

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS
office@lizlake.com www.lizlake.com



© COPYRIGHT LIZ LAKE ASSOCIATES Reproduced from Ordnance Survey map data by permission of Ordnance Survey © Crown copyright 2015 Licence No.100007196
© Crown copyright and database rights 2015 Ordnance Survey Licence No.0100031673

Stansted:
Unit 1, The Exchange,
9 Station Road, Stansted, CM24 8BE

t +44 (0)1279 647044
e office@lizlake.com
www.lizlake.com

Bristol:
1 Host Street,
Bristol, BS1 5BU

t +44 (0)117 927 1786

Nottingham:
Sutton Place, 49 Stoney St,
Nottingham NG1 1LX

t +44 (0)115 784 3566

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS

- Landscape Design
- Urban Design
- Residential
- Public Realm
- Masterplanning
- Landscape Planning
- Heritage Landscapes
- Gardens and Estates
- Restoration and Conversion
- Places of Worship
- Expert Witness
- Hospitality
- Education
- Retail / Office
- Community
- Ecology
- Arboriculture
- 3D / Graphic Design

Appendix C

WOODLANDS GARDEN VILLAGE, BRISTOL

STRATEGIC LANDSCAPE AND VISUAL ASSESSMENT

PUBLISHED LANDSCAPE CHARACTER ASSESSMENTS

December 2016

National Character Area profile:

118. Bristol, Avon Valleys and Ridges

Supporting documents



NATURAL ENGLAND

www.naturalengland.org.uk

Introduction

As part of Natural England's responsibilities as set out in the Natural Environment White Paper[1], Biodiversity 2020[2] and the European Landscape Convention[3], we are revising profiles for England's 159 National Character Areas (NCAs). These are areas that share similar landscape characteristics, and which follow natural lines in the landscape rather than administrative boundaries, making them a good decision-making framework for the natural environment.

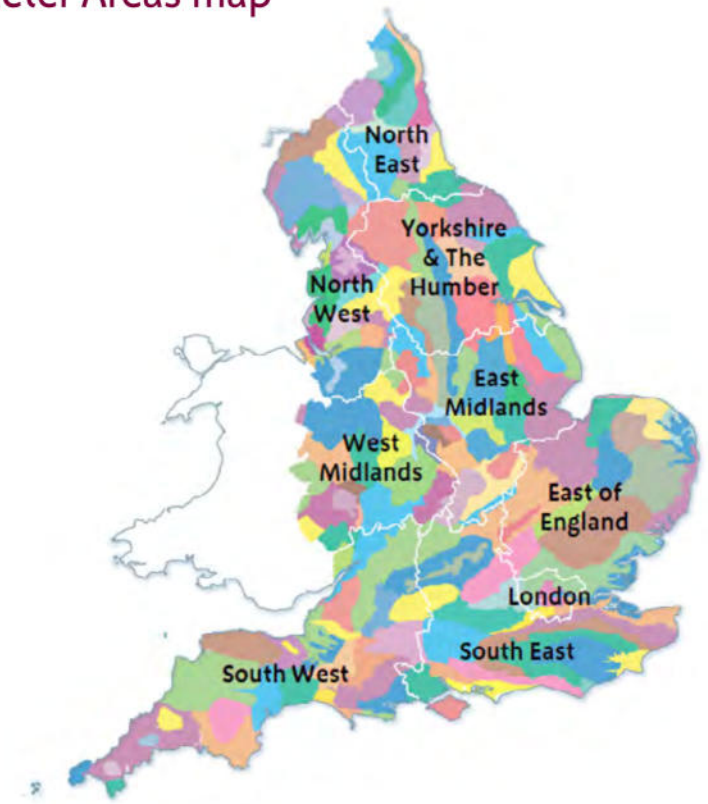
NCA profiles are guidance documents which can help communities to inform theirdecision-making about the places that they live in and care for. The informationthey contain will support the planning of conservation initiatives at a landscape scale, inform the delivery of Nature Improvement Areas and encourage broader partnership working through Local Nature Partnerships. The profiles will also help to inform choices about how land is managed and can change.

Each profile includes a description of the natural and cultural features that shape our landscapes, how the landscape has changed over time, the current key drivers for ongoing change, and a broad analysis of each area's characteristics and ecosystem services. Statements of Environmental Opportunity (SEOs) are suggested, which draw on this integrated information. The SEOs offer guidance on the critical issues, which could help to achieve sustainable growth and a more secure environmental future.

NCA profiles are working documents which draw on current evidence and knowledge. We will aim to refresh and update them periodically as new information becomes available to us.

We would like to hear how useful the NCA profiles are to you. You can contact the NCA team by emailing ncaprofiles@naturalengland.org.uk

National Character Areas map



[1] The Natural Choice: Securing the Value of Nature, Defra (2011; URL: www.official-documents.gov.uk/document/cm80/8082/8082.pdf)
[2] Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services, Defra (2011; URL: www.defra.gov.uk/publications/files/pb13583-biodiversity-strategy-2020-111111.pdf)
[3] European Landscape Convention, Council of Europe (2000; URL: http://conventions.coe.int/Treaty/en/Treaties/Html/176.htm)

Summary

The Bristol, Avon Valleys and Ridges National Character Area (NCA) encompasses the City of Bristol with its historic port, and the surrounding area including the Chew and Yeo valleys, Keynsham, Clevedon, Portishead and parts of the Cotswolds and Mendip Hills Areas of Outstanding Natural Beauty (AONB). The area is characterised by alternating ridges and broad valleys, with some steep, wooded slopes and open rolling farmland. It is flanked by the Somerset Levels and Moors and the Mendip Hills to the south, the Cotswolds to the east and the Severn and Avon vales to the west, which largely separates it from the Severn Estuary except for a small stretch of coastline between Clevedon and Portishead. It has a complex geology, being rich in geomorphological features such as the dramatic Avon Gorge, and there are many designated exposures and rich fossil beds. The varied settlement pattern has been influenced by the geology and geomorphology and the expansion of the City of Bristol at its centre. The M5 motorway runs up the western edge and the M4 skirts across the north of Bristol, with Bristol Airport to the south. Although the urban area covering this NCA is significant at over 21 per cent, much of the surrounding rural landscape is farmed.

The area is rich in history, from the evidence of Neolithic activity in the long barrows, through the Roman port at Sea Mills, to the more recent industrial history of mines and mills and the wealth of the port at Bristol. The Chew Valley Lake, which supplies water to Bristol, is designated a Special Protection Area for its internationally important numbers of shoveler ducks and nationally important numbers of gadwall, tufted duck and teal. The Mendip Hills AONB extends into the NCA to include the Chew Valley and Blagdon lakes. Species-rich grasslands and ancient woodlands are a feature of the area, with the ancient woodland and limestone grassland habitats of the Avon Gorge supporting many rare and unique species, including the Bristol whitebeam. The cultural ecosystem services in this NCA provide a strong sense of history. Biodiversity and geodiversity are nationally and internationally important. Food provision, especially dairy farming, is particularly prominent around the Yeo Valley, and water availability, water quality and regulation of water flow are all important ecosystem services in this NCA. Pressure from development and population expansion within this significantly urban area is a serious challenge, particularly in retaining the character of rural villages and avoiding widespread suburbanisation and increased traffic.

Click map to enlarge; click again to reduce.

Statements of Environmental Opportunity:

- **SEO 1:** Conserve and manage the distinction between small rural settlements and the densely urban City of Bristol, the urban fringe transitional zone and the commuter settlements; and ensure that new development is sensitively designed to contribute to settlement character, reduce the impact of the urban fringe and provide well-designed green infrastructure to enhance recreation, biodiversity and water flow regulation.

- **SEO 2:** Protect and manage the strong sense of history and many historical assets ranging from prehistoric barrows to the mining legacy, as well as the Avon Gorge and the many varied geological exposures within this geologically significant landscape, to enable recreation and access, education, tourism and continued enjoyment of the heritage of the area.

- **SEO 3:** Conserve and sustainably manage the gentle clay vales and limestone ridges and downs of the rural agricultural landscape and enhance the network of semi-natural habitats, linking them together to create a coherent and resilient ecological network, enabling ecosystems to adapt both to climate change and for the benefits to landscape, biodiversity, water flow, water quality, soil quality, soil erosion, rural heritage and culture.

- **SEO 4:** Protect and manage the landscape, heritage and biodiversity associated with the Avon River corridor, other river valleys and lakes, planning for a landscape-scale enhancement of wetlands, wet woodland and semi-natural grasslands along river flood plains for the benefits to biodiversity, climate regulation, water quality and flooding mitigation.



View to the north from Chewton Edge showing undulating vale landscape. Livestock farming predominates in this NCA.

Description

Physical and functional links to other National Character Areas

The western and north-western edge overlooks the flat Lower Severn Levels of the Severn and Avon Vales NCA, with further views across the estuary to the Forest of Dean and Wales. To the south, the Mendip Hills NCA rises from the Chew Valley. Outstanding viewpoints of Bristol and the surrounding area are gained from Brandon Hill and Cabot Tower. To the east and the south, the Cotswold scarp and Mendip Hills rise in an abrupt boundary, while at the south-eastern corner of the NCA the southern end of the Cotswolds and eastern end of the Mendips merge into an area of 'confused undulations'.

The River Avon cuts a steep-sided valley through the area from the east, having passed through the Severn and Avon Vales NCA and Cotswolds NCA. It is joined by the Chew near Keynsham, which rises on the Mendips' edge, and the Frome, which flows from the Cotswold edge at the north-east of the area to form the 2.5 km spectacular Avon Gorge in the centre of Bristol. Other streams and rivers in the south-east flow eastwards to join the Avon outside the NCA, and the Yeo on the south-western edge flows out across the North Somerset Levels and Moors directly to the sea. The River Severn connects this NCA with others that border the estuary through fluvial and tidal processes up and down the estuary.

The area is well connected to neighbouring NCAs and beyond by the rail network and the M4 and M5 motorways that cross the area, intersecting at the northern edge of Bristol, which provide fast connections north, south, east and west.



Rockface at Avon Gorge showing strata of the Carboniferous Limestone.

Distinct area

- City of Bristol

118. Bristol, Avon Valleys and Ridges

Key characteristics

- Low-lying, shallow vales that contrast sharply with high, open downland ridges as the varied landform reflects the complex underlying geology, comprised of Carboniferous limestones with sandstones, silts and conglomerates, together with muds, clays and alluvium. Coal Measures are also present.
- The River Avon cuts a steep-sided valley through the area from the east, forming the 2.5 km long, c.100 m high gorge at Bristol. It is joined by the Frome at the centre of Bristol and the Chew near Keynsham. Other streams and rivers in the south-east flow eastwards to join the Avon outside the NCA, and the Yeo on the south-western edge flows directly to the sea.
- Water supply for Bristol and the surrounding area provided by Chew Valley Lake, Blagdon Lake, and the smaller Chew Magna Reservoir and the reservoirs at Barrow Gurney. These reservoirs also impound river flow, while releasing a set minimum flow downstream at all times.
- A wide range of soil types, from brown earths on Limestone outcrops to poorly draining gleys on clays, which reflects the underlying influence of the complex geology.
- The most extensive areas of woodland lie between Congresbury and the Avon Gorge and on the Failand Ridge. These are internationally significant, containing rare endemic whitebeam species. Elsewhere, woodlands are smaller and fragmented and mainly confined to steeper land; the majority are broadleaf.
- Agriculture is predominantly livestock rearing, with arable in the flatter land to the north-east, with larger field sizes and infrequent hedgerow trees. Valleys and steeper slopes in the south-east tend to have irregular fields and overgrown, species-rich hedges.
- A diverse landscape important for greater and lesser horseshoe bats. Grasslands of high nature conservation interest remain on the wetter valley bottoms and dry downland slopes. Chew Valley Lake Special Protection Area (SPA) and Blagdon Lake Site of Special Scientific Interest (SSSI) support large numbers of wildfowl, plants and invertebrates, and are surrounded by species-rich lowland meadow.
- A long, historic timeline, with important fossil features visible in geological exposures, Neolithic long barrows and stone circles, iron-age hill forts and historic associations with Bristol's port and parkland creating important landscape features.
- Settlements dating from the medieval period, clustered around springheads of the Cotswold scarp or along the springline of the Mendips. In the vales they are scattered, linked by a complex network of lanes, with linear mining villages superimposed. Settlement becomes especially dense in the south-east, with many villages enlarged as commuter settlements.
- Older village buildings, gentry houses and mansions of local ashlar, which includes pale yellow Jurassic oolitic limestones and grey Carboniferous and Lias limestones. Red or brown sandstone is used in the north, and Pennant Sandstone at Nailsea 'Flats' in the south-west.
- Bristol and its commercial, industrial and residential areas; major roads (M4 and M5 motorways); the airfields (Filton and Bristol); and reservoirs, which occupy a substantial area around Bristol. There is considerable commercial development around Cribbs Causeway, Aztec West and Abbey Wood.
- The City of Bristol itself, which is a popular destination for overseas and domestic visitors and is one of the most affluent cities in the UK, providing employment for settlements in the NCA and beyond.

Bristol, Avon Valleys and Ridges today

Characterised by alternating ridges and broad valleys, with some steep, wooded slopes and open rolling farmland, the large urban expanse of the City of Bristol, with its dramatic limestone gorge of the River Avon, dominates the central and western part. The area is strongly defined by the NCAs that border it, with the scarps of the Cotswolds and Mendips in neighbouring NCAs to the east and south, and provides part of the landscape setting for the Cotswolds and Mendip Hills Areas of Outstanding Natural Beauty (AONB). To the west, the area overlooks the flat Lower Severn and North Somerset Levels and, beyond that, the Severn Estuary and Wales. Occasional high points break through creating landmarks, for example Dundry Hill to the south of Bristol, at 233 m in height with 360° views and, within the City of Bristol itself, Brandon Hill, topped by Cabot Tower, which provides a platform for a panoramic view of the city and beyond to the hills in the distance.

The varied landforms and settlement patterns of the NCA are strongly influenced by its diverse geology and complex geological history. The area has also made a considerable contribution to the history of the development of geology as a science through the studies of William Smith, the 'Father of English Geology' .

Rivers such as the Chew and Avon have carved gorges in the older, more resistant rocks, while those such as the Frome have formed wide, shallow valleys in the softer, younger ones. The rivers have been heavily modified in urban areas. The limestone-derived soils are predominantly brown rankers and argillic brown earths. On the clays, poorly draining gleys are common, whereas the Coal Measure soils are more acidic. This variability in soil type is a result of the complex underlying geology and is reflected in the range of habitats that have developed and the opportunities for human land use.



Wilmott's whitebeam, one of the species endemic to the Avon Gorge.

The higher ground and steep scarps of the limestone ridge along the western edge extend from the Yeo Valley towards Thornbury; sandstone outcrops are present in places. The dramatic Avon Gorge cuts through the ridge at Bristol, spanned by the historic Clifton Suspension Bridge, rising about 100 m from the tidal River Avon to Observatory Hill on the eastern side and Stokeleigh Camp to the west. The gorge has natural cliffs and quarry exposures of Carboniferous Limestone, which are of great geological interest, and, together with the screes, scrub, pockets of grassland and adjacent woodland, it supports an exceptional number of nationally rare and scarce plant species. Further south the ridge forms the distinctive landscape of

the Failand Hills. Ashton Court, the grandest of the parklands, makes good use of the limestone landform and provides a wide range of recreation opportunities for the surrounding population. To the west, the ridge falls – often steeply – to the levels. Along the scarp, woodland predominates; above the scarp there is open country, where large fields and low, rectilinear hedges lie around scattered farmsteads and houses, with mixed woodland blocks and patches of arable.

Concentrations of ancient woodland are found at Leigh Woods on the gorge s western side, to the north-east of Congresbury along the Failand Ridge (for example Lime Breach Wood near Cadbury Camp) and at Lower Woods SSSI near Wickwar. Elsewhere, the woodlands are much smaller and fragmentary, often on the steeper land, with their great variety reflecting the overall complex geology. In the former mining areas, they are augmented by planting on reclaimed colliery tips. Parkland such as at Tyntesfield and Ashton Court form characteristic features south and west of Bristol, where the woodlands and mature and exotic trees bring a distinctive local character.

The ridge contrasts with the gentle clay vale of the Frome north of the Avon; here the landscape is more open, particularly on the lower ground, giving way to an intricate field pattern mixed with woodland on the surrounding higher land. There are few hedgerow trees, and pylons are conspicuous. The settlement pattern is indistinct; there are some large villages, but many houses are scattered along the sparse network of roads and there are isolated farmsteads. At the northern edge of the area there is another, more undulating, type of landscape, as the land rises to the Cotswolds. To the east, the land is more rolling, and views of the Cotswold scarp begin to dominate. New settlements are particularly noticeable since there is little woodland.

South of Bristol, the land falls to the Yeo and Chew valleys, where Chew and Blagdon lakes, within the Mendip Hills AONB, are prominent features near the foot of the Mendip scarp. These lakes also provide a valuable source of drinking water and are designated as Drinking Water Protected Areas under the Water Framework Directive (WFD). Both lakes and the surrounding land are also of conservation value and provide recreational fishing, windsurfing and sailing. Chew Valley Lake is an SPA due to its internationally important population of shoveler ducks and nationally important numbers of gadwall, tufted duck and teal. The surrounding species-rich lowland meadow adds to the nature conservation value of the area. Long barrows, iron-age hill forts and the Wansdyke (a linear defensive earthwork) provide evidence of how long this area has been settled.

Merging with the eastern part of the Mendip Hills is a rolling landscape of hill-top pastures, deep river valleys, many stone villages and hamlets, and farmsteads linked by narrow, hedged lanes. There are often contrasts in the textures of the grassland, with rough grassland on the steeper slopes and lusher pastures in the valley bottoms. The gentler slopes are more open; the hedges are lower and there is more arable. Threading through this south-eastern landscape are the remains of the mining industry characterised by occasional spoil heaps, straggling settlements and small irregular fields including smallholdings. Midsomer Norton, Radstock and Paulton form large settlements that were once strongly associated with mining but are now commuter towns for Bath and Bristol.

At the heart of the NCA is the City of Bristol – the oldest parts and those with the most distinctive townscapes being the old city centre, the docks and Clifton, with its downs. The conurbation spreads down the river to the industrial complex of Avonmouth in the adjacent Severn and Avon Vales NCA. To the south-west, a boundary is formed by the Avon Gorge, and the river continues through the city. To the south and east, housing extends to Dundry Hill and is broken by fragments of farmland. Bristol Airport dominates the hill top along from Dundry. In the north and north-east, development is dispersed across a

wide area and the motorways are prominent. Modern residential development, extending as far as Yate, is broken by open farmland. The strongest landscape structure is represented by formal landscapes such as Stoke Park and Oldbury along the lower Frome Valley and by modern commercial landscapes such as Aztec West and Cribbs Causeway. With its mix of urban and rural landscape, the provision of green infrastructure and quality green space is highly valued by the City of Bristol and surrounding unitary authorities in order to retain its attractiveness for inward investment. The NCA has a high level of accessible green space per head of population.[4]

A short coastal stretch of the NCA occurs between Clevedon and Portishead, where limestone cliffs descend to the Severn Estuary. The Victorian seaside resort of Clevedon hosts the only structurally intact Grade I-listed pier in the UK, opened in 1869 to enable passengers to board steamers to south Wales. The town is well connected to the heart of Bristol by public transport and the National Cycle Network.

Although there is much uniform 20th-century housing across the area, many of the older village and town buildings in grey Carboniferous or Lias limestones or Jurassic oolites survive. There is much variation in the building stone used;[5] for example, sandstone is prevalent in the north, while white, rather bleak Lias limestone is common in the south-east within the Midsomer Norton–Radstock area. Around Nailsea, stone boundary walls of Pennant Sandstone known as Nailsea flats are found; where this stone is used in buildings it tends to be rendered. With a wide choice of attractive materials, including Bath Stone and Cotswold Stone, many of the mansions, gentry houses and churches are fine buildings in mellow tones, but there are also unspoilt village and town streets such as the centre of Chipping Sodbury. The principal roads radiate from the old centre of Bristol. Much modern settlement is close to these corridors or to the M4 and M5 motorways.



Blagdon Church tower with Blagdon Lake beyond. Blagdon and Chew Valley lakes are important for both their conservation value and for water supply.

Bristol is one of the most affluent cities in the UK and has a strong manufacturing and service sector, providing employment for the settlements in the NCA and beyond. It is a popular destination for overseas and domestic visitors, as it is easy to reach by road, rail and air and is close to Bath, another popular tourist destination.

[4] Accessible Natural Greenspace Standard data, published by Natural England

[5] Strategic Stone Study: A Building Stone Atlas of Avon, English Heritage (2011; URL: www.bgs.ac.uk/mineralsuk/mines/stones/EH_atlases.html)

The landscape through time

The varied topography of this NCA is related both to the nature of the underlying rocks and to the amount of erosion to which they have been subjected. In general, the harder Palaeozoic rocks form areas of moderately high relief (such as Broadfield Down near Bristol Airport) that exceed 125 m above sea level. The solid geology consists mainly of Upper Palaeozoic (Devonian Sandstone and Carboniferous Limestone) and Mesozoic (Triassic–Middle Jurassic) rocks. The extreme north of this NCA also features important Silurian rocks with igneous intrusions. The Carboniferous Limestone has been quarried in the area since prehistoric times, ranging from small extractions to large, modern quarries such as at Wickwar, Tytherington and Chipping Sodbury.

Repeated geological periods of inundation and drying have resulted in sedimentation forming fossil-rich strata from a number of geological periods. The Coal Measures were formerly extensively mined but the last pit closed in 1973 and exposures today are usually confined to small scrapes on disused, landscaped tips. Writhlington SSSI is a notable exception, and fossil Coal Measure plants and insects can still be collected from the shales. The area around Keynsham is famous for its 'Blue Lias' fossils.

During the early Jurassic, parts of the area remained as islands, and Lower Lias deposits occurred here. The youngest Jurassic sediments exposed in the area are approximately 190 to 175 million years old and out-crop on Dundry Hill. Here Middle–Upper Lias siltstones and limestones are capped by pale oolitic limestones. These marine sediments are well known for their abundant and well-preserved ammonite and brachiopod fossils.

The high ground in the west and south of the area was settled at an early date. There is good evidence of Neolithic activity, for example the long barrows and stone circle at Stanton Drew. The ridges continued to be of importance through the Iron Age not least as the sites of hill forts, of which Cadbury Hill is the best known. The lower-lying clay vales had attracted settlement too, but it is likely that the heavier ground, for instance along the Frome Valley, was not cleared until later.

By Roman times, many parts of the area had been settled for a long time and the importance of the Avon was evident from the port at Sea Mills. Villas lay either side of the Avon Valley and on the fertile soils north of the Mendip Hills. After the Romans left, significant 'dark-age' settlements were present on the eastern edge. The Saxon takeover occurred in the 6th century and the impressive earthworks of the Wansdyke, cutting across the ridges south of Bristol, date from this era.

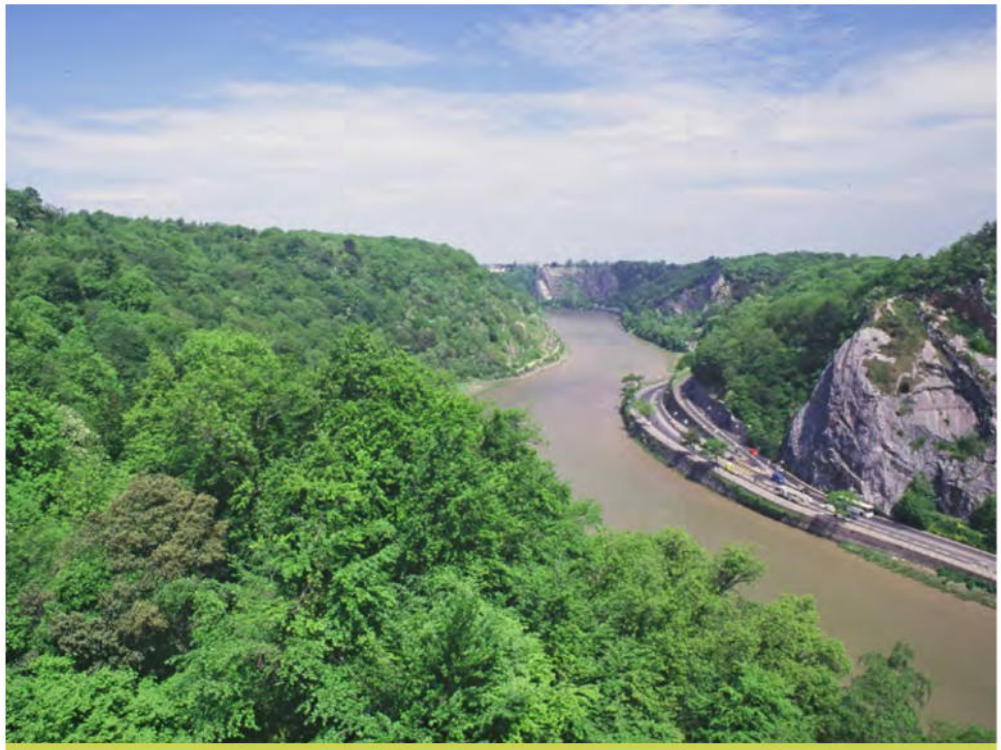
By the later Saxon period, important centres existed at Pucklechurch, Chew and elsewhere, and the town of Bristol was already established by the time of the Norman Conquest.

The area was dominated by the port of Bristol, which expanded rapidly into England s second largest city from the 12th century, exporting corn and especially wool and cloth, and importing wine and wool from western France. As a result, lesser towns like Thornbury and Chipping Sodbury also prospered. The area s settlement, as developed by the 11th century and later centuries, displayed a great variation, from villages surrounded by open fields to medieval farmsteads and hamlets with early enclosed fields in the clay vales, all interspersed with patches of common and woodland. There was, however, extensive open downland on the western limestone area, and a large royal forest lay around Kingswood, up to 500 km2 at its peak (Kingswood Chase was carved out of the forest in the early 13th century).

Following the 14th century and, in particular, the rapid population decline that followed the disaster of the Black Death, open fields began to be enclosed; however, many remained in use in the north of the area, and much of the open downland was unenclosed until the 19th century. Grazed calcareous grasslands have largely been ploughed up or improved in the last 50 years; those that remain are generally restricted to very shallow soils or the steep hillsides that are less accessible to farm machinery.

A coal industry was present in the Middle Ages, and it developed on a large scale from the mid-18th century. Small pits were dispersed across the countryside, often fuelling local industries such as the brass foundry at Keynsham and the smelting works at Wormley. The Somerset Coalfield was significant enough to justify the construction of the Somerset Coal Canal. William Smith was one of the surveyors on the canal and some of the mines, and it was here that he developed his theory of stratigraphy. The pits were active well into the last century, but there was rapid decline following nationalisation and the last pit closed in 1973. Today, most of the obvious evidence has disappeared and the tips have been largely reclaimed.

During the medieval period, Bristol had become important enough as a port to sponsor John Cabot's 1497 expedition of discovery to America in the founding of Newfoundland. In the post-medieval period, Bristol expanded to become Britain s second port based on its trade in sugar cane, tobacco, rum, cocoa and slaves; indeed, Bristol s trade in slaves exported to the colonies brought great wealth to the city. Exported goods such as tobacco were processed in warehouses and factories, visible alongside the docks today. In the 18th and 19th centuries the city continued to prosper and expand on the basis of its trade, engineering and other industries. The wealth that it generated is evident in the legacy of wealthy merchants houses that remains today, including the area around King Street, Queen Square, St Michael s Hill and Clifton village. The 19th century witnessed renewed efforts to deepen the Avon and remodel and extend the city docks. Isambard Kingdom Brunel helped to attract further investment into the area. Brunel did more than anyone to shape the character of modern Bristol; his legacy includes Clifton Suspension Bridge, the SS Great Britain and Temple Meads station. Despite this, the city lost the transatlantic trade to Liverpool and other ports, Avonmouth taking its place as a major port from the early 20th century.



Leigh Woods ancient woodland SSSI along the Avon Gorge.

The legacy of Bristol's wealth is also evident in the parks and mansions that surround the city, such as Dyrham Park, Dodington House, Tyntesfield, Blaise Castle and Ashton Court. These parklands are nationally important for their diversity and range of architectural styles and planting. The parklands now provide biodiversity interest in addition to significant areas of comparative tranquillity and recreation.

In the 20th century, Bristol expanded even more rapidly to include the Avonmouth port and oil refining complex (within the Severn and Avon Vales NCA). Issues of water supply to the expanding city led to the creation in the 1950s of Chew Valley Lake, by flooding farmland, to supplement the by-then insufficient Blagdon Lake, which had been created in the 1890s. These lakes are now of significant conservation interest for wildfowl, invertebrates and plants and are surrounded by important neutral grasslands that support a range of rare plant species, such as the green-winged orchid.

The M4 and M5 motorways through the area were constructed between 1962 and 1977. The airport at Lulsgate Bottom became Bristol International Airport in 1997 (now named Bristol Airport). Residential, commercial and light industrial areas, such as Cribbs Causeway and Aztec West, have extended into the surrounding countryside, and major new roads have been developed. Expansion, notably at Emersons Green, Bradley Stoke and Cribbs Causeway, has resulted in areas of farmland being lost, and the landscape character of these areas has altered significantly. The growth has affected the whole NCA, and many of the outlying settlements such as Yate developed both as their own employment centres and as dormitories of Bristol. The growth of settlement has probably been the main influence on the rural landscape. The decline and greening over of the coal industry, the construction of major reservoirs and the loss of substantial tree cover as a result of Dutch elm disease have also been significant.



The Clifton Suspension Bridge rising above the Avon Gorge, designed by Isambard Kingdom Brunel but contructed after his death.

Future development within Bristol and South Gloucestershire is focused near existing services. Bristol City Council is not planning any urban extension, but South Gloucestershire Council is proposing significant development on the northern (the majority of which is housing) and eastern (mostly employment) fringes of Bristol, together with expansion at Yate and Thornbury, largely to accommodate new housing. Bath and North East Somerset Council is focusing on development in urban areas and brownfield at Keynsham and the larger settlements in the Somer Valley within this NCA, while North Somerset Council is concentrating its urban development outside this NCA. The planned expansion of Bristol Airport may significantly impact on the tranquillity and traffic of this NCA and the adjacent Mendip Hills NCA.



View from Dundry Hill showing the contrast between the rural landscape and the urban expanse of the City of Bristol.

Ecosystem services

The Bristol, Avon Valleys and Ridges NCA provides a wide range of benefits to society. Each is derived from the attributes and processes (both natural and cultural features) within the area. These benefits are known collectively as 'ecosystem services'. The predominant services are summarised below. Further information on ecosystem services provided in the Bristol, Avon Valleys and Ridges NCA is contained in the Analysis section of this document.

Provisioning services (food, fibre and water supply)

- **Food provision:** The Bristol, Avon Valleys and Ridges NCA supports a wide range of farming. Figures from 2009 show that 46,251 ha are covered by commercial farming, which is dominated by livestock farming. Yeo Valley foods (a national dairy producer) is based in the fertile soils north of the Mendip Hills.

- **Water availability:** The main rivers in this NCA are the Avon, the Frome, the Chew and the Congresbury Yeo. There are also two major reservoirs that supply water within this NCA: Blagdon Lake; and Chew Valley Lake. These reservoirs are fed by springs, rivers and streams that emerge from the Mendip Hills. Blagdon and Chew Valley lakes are eutrophic due to high levels of nutrients in the water, and both lakes are designated as Drinking Water Protected Areas. The area surrounding each lake is designated a nitrate vulnerable zone (NVZ) under the Nitrates Directive. There are no major aquifers within the NCA itself. Most of the area is classed as having 'no water available' for additional abstraction. The reservoirs supply 1.1 million people and businesses in the Bristol area.



Field scabious nectar cafe. The species-rich grasslands and verges of the NCA are important resources for pollinators.

Regulating services (water purification, air quality maintenance and climate regulation)

- **Regulating soil erosion:** The majority of the soils in this NCA are subject to erosion where management results in a loss of stabilising vegetation, as the soil types are easily damaged. Current contributions to the regulation of soil erosion are low. The North Somerset Moors catchment priority funding statement supports measures being taken to minimise soil wash entering watercourses, prevent pathways for run-off and protect receiver watercourses. Such measures could beneficially be applied across the NCA and neighbouring NCAs.

- **Regulating water quality:** Part of the NCA falls within the North Somerset Moors priority catchment. The Congresbury Yeo has problems relating to sedimentation, phosphates, nitrogen enrichment and low dissolved oxygen, which have resulted from downwash off the steep slopes of the Mendip Hills and Broadfield Down. The upper Congresbury Yeo catchment is included within an NVZ. Stretches of the River Avon have failed to achieve good chemical quality, and the lower part of the catchment suffers from Water Framework Directive (WFD) ecological failures (primarily fish failures). Equally, parts of the Frome within this NCA are classified as having bad ecological status, on account of fish failures and the presence of phosphates in some waterbodies. This contrasts with tributaries in the upper reaches of the NCA boundary, which are at 'good' ecological status.

- **Regulating water flow:** While there is little or no risk of flooding across most of the NCA largely due to the flood defence works that have been put in place, there are some areas where flood risk is higher, including parts of the River Avon, the Chew Valley and the coastal settlements such as Portishead and Clevedon.



Cotswold Way National Trail at Little Sodbury Fort.

Cultural services (inspiration, education and wellbeing)

- **Recreation:** Recreation is supported by the area s outstanding range of parks, the Forest of Avon Community Forest, the Mendip Hills AONB Partnership, the River Avon Trail, the Bristol and Bath Railway Path, The Monarch s Way, 1.9 km of the Cotswold Way National Trail and a large number of other long-distance trails and National Cycle Network routes.

Overall there is a 2,200 km network of rights of way at a density of 2.56 km per km2 and around 1,000 ha of open access land covering 1.12 per cent of the NCA, which is particularly important in this highly populated area. The geology provides opportunities for caving and climbing.

- **Sense of history:** The area retains a strong sense of its maritime past and contains a wide range of visible history across both the rural and the urban landscape, from Neolithic barrows and iron-age hill forts, to the Roman influences such as the port of Sea Mills and its architectural and parkland heritage, to the more recent industry and activity associated with mining, mills and the port at Bristol.

- **Biodiversity:** Some 5 per cent of the NCA is covered by priority habitats (4,300 ha): 3,600 ha of this is priority woodland (lowland mixed deciduous and wet woodland), with 900 ha of reedbeds and 600 ha each of lowland meadows and coastal and flood plain grazing marsh. Some 2,000 ha (2 per cent) of the NCA is designated as SSSI; there are two SPAs, three Special Areas of Conservation, one Ramsar site and two National Nature Reserves – Gordano Valley (in part) and Leigh Woods. The majority of SSSI in the area are currently in favourable or recovering condition. The Avon Gorge SAC supports numerous rare species in its ancient woodlands.

- **Geodiversity:** There are 27 SSSI in this NCA that are designated for their features of geological interest. These reflect the geological importance of this area. Many of these sites consist of quarries and cuttings, but there are also natural features such as the Avon Gorge and coastal exposures. Geological SSSI that contain significant fossil assemblages are a feature of the NCA.



View from Blagdon across the farmland to Bristol Airport in the distance.

Statements of Environmental Opportunity

SEO 1: Conserve and manage the distinction between small rural settlements and the densely urban City of Bristol, the urban fringe transitional zone and the commuter settlements; and ensure that new development is sensitively designed to contribute to settlement character, reduce the impact of the urban fringe and provide well-designed green infrastructure to enhance recreation, biodiversity and water flow regulation.

For example, by:

- Working with local planning authorities to regulate and mitigate the impact of residential and commercial development pressure, which is particularly prevalent along the M5 corridor and around the Bristol conurbation. This will safeguard the countryside, greenbelt and Areas of Outstanding Natural Beauty (AONB).
- Enhancing the many recreational opportunities offered, through active management and provision of quality infrastructure such as the development of multi-user paths, clear signposting and better interpretation, to improve understanding, appreciation and enjoyment of the natural, historic and built environment, while planning for increasing recreational pressure due to population expansion.
- Protecting the strong character of the old City of Bristol, its port and its historic associations.
- Working with landowners and local planning authorities to manage increasing urban fringe pressures on agricultural land, including the difficulties of managing urban fringe farms.
- Encouraging local planning authorities and developers to incorporate landscape design into urban extensions from the start of the process, to include biodiversity, green infrastructure and access enhancements together with well-planned transport routes, including public transport, to reduce the impact of traffic.
- Improving the links between settlements, particularly the City of Bristol and the surrounding countryside, to improve access to the countryside, utilising the rights of way network, river corridors and sustainable transport networks.
- Promoting sustainable drainage in development to increase permeable surfacing, to reduce run-off and increase water filtration in urban areas. This will slow the water entering the system.
- Protecting and maintaining the surface water environment through sustainable use of water resources by ensuring that low water consumption devices are included in all developments.
- Maintaining characteristic settlement patterns of the ridges and vales and encouraging sensitive development or alterations in villages, using vernacular materials to maintain their local and rural character.
- Managing the continued quarrying of local stone, ensuring that it is sensitive to the needs of geological interests, biodiversity and landscape.

SEO 2: Protect and manage the strong sense of history and many historical assets ranging from prehistoric barrows to the mining legacy, as well as the Avon Gorge and the many varied geological exposures within this geologically significant landscape, to enable recreation and access, education, tourism and continued enjoyment of the heritage of the area.

For example, by:

- Protecting evidence of Neolithic, bronze-age and iron-age activity in the landscape – for example, Neolithic long barrows and the stone circle at Stanton Drew, bronze- and iron-age barrows and features such as Cadbury hill fort – through appropriate land management, such as permanent grassland to protect below-ground features.
- Promoting the importance of the port at Sea Mills during the Roman period and protecting the evidence of villas either side of the Avon Valley and on the fertile soils north of the Mendip Hills, with interpretation for educational and recreational uses.
- Protecting the remaining earthworks of the Saxon Wansdyke.
- Protecting medieval field patterns and ridge and furrow through permanent grassland.
- Conserving and enhancing, for the enjoyment of all, the area s diverse range of architecture, including its traditional buildings and farmsteads, and Bristol's historic port and its suburbs, houses and buildings constructed from the wealth that it generated, evident in parks and mansions such as Dyrham Park, Tyntesfield, Doddington House, Blaise Castle and Ashton Court.
- Conserving and providing interpretation for the area s rich and complex industrial history, particularly features associated with the coal and copper industries, rural mills and early port and industrial buildings; and the legacy of Brunel through the architecture of Temple Meads station and the Clifton Suspension Bridge.
- Conserving and managing the area s important range of historic parklands, many of which are designated as Registered Historic Parks and Gardens. This will ensure a high-quality experience for all visitors and the retention of the important contribution of the parklands to landscape character, including through the establishment of new generations of trees, appropriate management of ancient and veteran trees and retention of deadwood fauna and flora.
- Conserving and protecting the area s many ancient and veteran trees through the use of Tree Preservation Orders to ensure that they are properly considered in planning decision-making; and promoting best practice to ensure a succession of veteran trees in woodland and the wider landscape.
- Conserving and protecting the geological features representative of the complex geology of the area through working with landowners and land managers to manage these features appropriately, and by providing good-quality access and interpretation to improve the understanding of the significance of the geology of this area, as well as to provide recreation opportunities.
- Ensuring that interpretation of Bristol's historic port, city and industrial legacy brings out their role in the development of landscape over time and continues to provide inspiration through the sense of place that the area provides.

SEO 3: Conserve and sustainably manage the gentle clay vales and limestone ridges and downs of the rural agricultural landscape and enhance the network of semi-natural habitats, linking them together to create a coherent and resilient ecological network, enabling ecosystems to adapt both to climate change and for the benefits to landscape, biodiversity, water flow, water quality, soil quality, soil erosion, rural heritage and culture.

For example, by:

- Protecting and managing existing species-rich lowland meadow, lowland calcareous and flood plain grassland UK Biodiversity Action Plan (BAP) priority habitats for the species they support; and restoring, creating and consolidating areas of semi-improved grasslands, which have an important role in accentuating underlying geology and in maintaining a sense of locality. This will create a functional and resilient grassland network.
- Sensitively managing road verges, which can play an important part in linking grasslands and provide important sources of nectar for pollinating insects, thus benefiting agriculture.
- Continuing to encourage the conservation and active management of existing woodland, including ancient woodland, mixed woodland blocks and shelterbelts; and promoting new planting where appropriate in accordance with the strategic ambition of the Forest of Avon Community Forest and the Mendip Hills AONB and Cotswolds AONB management plans. This will enhance the contribution of woodland to the landscape, recreation and biodiversity.
- Managing and restoring the historic network of field boundaries, including hedgerows and hedgerow trees. This will enhance historic landscape value, facilitate their key function of reducing surface water flows and soil erosion and recognise their importance, in combination with the area's geology, as habitats for rare species, in particular the greater horseshoe bat.
- Connecting the woodland network by managing hedgerows appropriately, to link woodland with other wooded habitats – such as traditional orchards and wood pasture and parkland.
- Managing, restoring and planting traditional orchards, to conserve the genetic continuity of fruit species; to retain significant archaeology and wood pasture habitats, including a continuity of deadwood and rot holes; and to improve the condition of the underlying grassland to enhance the lowland meadow resource.
- Managing and restoring field boundaries including hedgerows, hedgerow trees, drystone walls and drainage ditches in keeping with local styles and management traditions.
- Protecting the unique and rare species of the Avon Gorge.
- Promoting sustainable farming practices that encourage the movement and support of species.
- Managing peat soils in the Gordano Valley and managing other wetland habitats so that biodiversity value associated with wet meadow, reedbed and carr communities and carbon sequestration and protection of existing carbon storage is fully realised.
- Encouraging the restoration of natural condition to those watercourses in the NCA that are classed as heavily modified or artificial waterbodies and seeking mitigation work through new development to help restore natural conditions.
- Managing river corridors to utilise existing river flows for the maximum ecological benefit and protecting and enhancing the ability of waterbodies to provide wildlife corridors.

SEO 4: Protect and manage the landscape, heritage and biodiversity associated with the Avon River corridor, other river valleys and lakes, planning for a landscape-scale enhancement of wetlands, wet woodland and semi-natural grasslands along river flood plains for the benefits to biodiversity, climate regulation, water quality and flooding mitigation.

For example, by:

- Enhancing and protecting the river landscape, particularly the Avon, through landscape-scale approaches to conservation and restoration of semi-natural habitat, particularly flood plain habitat such as wet woodland and flood meadows. This will create a coherent river and flood plain ecological network.
- Promoting catchment sensitive farming practices, reducing sources of diffuse agricultural pollution and the volume and rates of run-off and soil erosion. This will protect the water quality of open water, such as the internationally important Chew Valley Lake and Blagdon Lake, as well as the rivers of the area, benefiting many ecosystem services, including soil quality, soil erosion, water quality, water availability and biodiversity.
- Conserving and expanding areas of semi-natural habitat, woodland and hedgerows, which slow the flow of water across the landscape. Potentially this will reduce peak flow levels during high rainfall, mitigating flooding and helping to slow soil erosion; will maintain higher flow during dry periods for the benefit of people and biodiversity; and will allow opportunities for flood water storage to be realised where they are identified.
- Encouraging the re-profiling and naturalisation of watercourses to reduce the speed of water flow through river and stream channels.
- Ensuring that water companies, local authorities, highways agencies and developers create surface water management strategies that include sustainable urban drainage, to reduce the volume of water running directly into drains and therefore watercourses.
- Influencing and delivering improvements through the Bristol Avon Catchment Plan (the Department for Environment, Food and Rural Affairs Bristol Avon catchment-based approach pilot).
- Increase understanding and awareness of the importance of the area's water resources among groups such as visitors, schools and landowners.

Additional opportunity

1. Manage the recreational and tourism opportunities of both the City of Bristol and its surrounding countryside to improve opportunities for enjoyment and understanding of the area's heritage, countryside and coast for their inspirational and diverse qualities.

For example, by:

- Maintaining and developing multi-user routes and improved route connectivity to provide sustainable transport options wherever possible and enable more people to access the natural and built environment.
- Enhancing the many recreational, educational and tourism opportunities offered while managing visitor demand through provision of sufficient good-quality infrastructure and information.
- Ensuring completion of the Wansdyke ditch long distance footpath, which would provide many opportunities for historical interpretation.
- Promoting sustainable tourism initiatives that target a broad range of visitors and reduce car dependency. This involves accommodating high visitor numbers while conserving the natural and built environment, for example through promotion of the Bristol waterbus ferry service, the National Cycle Network and good rail connections.



The area is defined by the strong landscapes surrounding it such as the Mendip Hills: view from Cowslip Green looking towards the Mendip Hills.

Supporting document 1: Key facts and data

Total area: 84,255 ha

1. Landscape and nature conservation designations

About 5 per cent of the Bristol, Avon Valleys and Ridges NCA is designated as an Area of Outstanding Natural Beauty (AONB). This is made up of a combination of the Mendip Hills AONB to the south covering 4 per cent and the Cotswolds AONB covering 1 per cent to the north.

Management plans for the protected landscape(s) can be found at:

- www.mendiphillsaonb.org.uk/
- www.cotswoldsaonb.org.uk/

Source: Natural England (2011)

1.1 Designated nature conservation sites

The NCA includes the following statutory nature conservation designations:

Tier	Designation	Name	Area (ha)	Percentage of NCA
International	Ramsar	Severn Estuary	30	<1
European	Special Protection Area (SPA)	Chew Valley Lake SPA; Severn Estuary SPA	605	1
	Special Area of Conservation (SAC)	Avon Gorge Woodlands SAC; North Somerset and Mendip Bats SAC; Severn Estuary SAC	303	<1
National	National Nature Reserve (NNR)	Gordano Valley NNR; Leigh Woods NNR	140	<1
National	Site of Special Scientific Interest (SSSI)	A total of 51 sites wholly or partly within the NCA	2,083	2

Source: Natural England (2011)

Please note: (i) Designated areas may overlap (ii) all figures are cut to Mean High Water Line, designations that span coastal areas/views below this line will not be included.

Land covered by International and European nature conservation designations totals 882 ha, or 1 per cent of the total land area; national designations cover 2,083 ha or 2 per cent. The Severn Estuary Ramsar and SPA cover the same area and lie within the Severn Estuary SAC. Most of the Severn Estuary SAC is not designated as SSSI, but the other SACs and both SPAs are. The NNRs mostly lie within an SSSI designated area.

There are 379 local sites in the Bristol, Avon Valleys & Ridges NCA covering 4,341 ha or 5 per cent of the NCA.

Source: Natural England (2011)

- Details of individual Sites of Special Scientific Interest can be searched at: http://www.sssi.naturalengland.org.uk/Special/sssi/search.cfm
- Details of Local Nature Reserves (LNR) can be searched: http://www.lnr.naturalengland.org.uk/Special/lnr/lnr_search.asp
- Maps showing locations of Statutory sites can be found at: http://magic.defra.gov.uk – select 'Designations/Land-Based Designations/Statutory'.

1.2 Condition of designated sites

A breakdown of SSSI condition as of March 2011 is as follows:

SSSI condition category	Area (ha)	Percentage of SSSI in category condition
Unfavourable declining	68	3
Favourable	1,564	75
Unfavourable no change	39	2
Unfavourable recovering	412	20

Source: Natural England (March 2011)

Details of SSSI condition can be searched at:
http://www.sssi.naturalengland.org.uk/Special/sssi/reportIndex.cfm

2. Landform, geology and soils

2.1 Elevation

At its lowest, the land lies 0.2 m below sea level rising to a maximum height of 227 m. The mean height is 80 m.

Source: Natural England (2010)

2.2 Landform and process

A predominantly limestone ridge extends from the Yeo Valley towards Thornbury, where sandstone outcrops are present. It is cut by the spectacular Avon Gorge on the edge of Bristol and to the west forms the distinctive landscape of the Failand Hills. To the west the ridge falls, often steeply, to the levels. To the east is a landscape of clay vales. They are large and broad-scale, around the River Frome and its tributaries, but smaller-scale and more complex around the many minor rivers and streams like the River Cam, Wellow Brook and River Chew. At the northern edge of the area there is another, more undulating, type of landscape as the land rises to the Cotswolds.

Source: Bristol, Avon Valleys and Ridges Natural Area Profile, Bristol, Avon Valleys and Ridges Countryside Character Area Description

2.3 Bedrock geology

The ridge, which extends irregularly through the area roughly parallel with the Severn, is mainly composed of Carboniferous Limestone, with sandstones, silts and conglomerates outcropping at the northern end. To the east, the mudstones and clays along the Severn are overlain widely by alluvium. To the north-east, red Mercia Mudstones and the grey clay of the Lias have been eroded to form a shallow vale. To the south-east, there is a complex of older faulted rocks overlain by younger Mesozoic limestone, clays and mudstones. The latter have been eroded in places resulting in many varied exposures.

Source: Bristol, Avon Valleys and Ridges Natural Area Profile, Bristol, Avon Valleys and Ridges Countryside Character Area Description

2.4 Superficial deposits

Extensive alluvial deposits extend from Clapton Moor to Avonmouth and northwards; in places along the River Avon, First and Second Terrace Gravel deposits can be distinguished. Alluvial sands and gravels at Weston-in-Gordano are fluvioglacial and interglacial in origin.

Source: Bristol, Avon Valleys and Ridges Natural Area Profile, Bristol, Avon Valleys and Ridges Countryside Character Area Description

2.5 Designated geological sites

Tier	Designation	Number of Sites
National	Geological Site of Special Scientific Interest (SSSI)	25
National	Mixed Interest SSSIs	2
Local	Local Geological sites	4

Source: Natural England (2011)

Details of individual Sites of Special Scientific Interest can be searched at:
http://www.sssi.naturalengland.org.uk/Special/sssi/search.cfm

2.6 Soils and Agricultural Land Classification

The limestone-derived soils are predominantly brown rankers and argillic brown earths. On the clays, poorly draining gleys are common, whereas the Coal Measures soils are more acidic. This NCA has 8 main soilscape types: slightly acid loamy and clayey soils with impeded drainage, covering 31 per cent of the NCA; slowly permeable seasonally wet slightly acid but base-rich

loamy and clayey soils, 14 per cent; freely draining slightly acid but base-rich soils, 13 per cent; shallow lime-rich soils over limestone, 11 per cent; freely draining slightly acid loamy soils, 11 per cent; slowly permeable seasonally wet acid loamy and clayey soils, 8 per cent; lime-rich loamy and clayey soils with impeded drainage, 8 per cent; and loamy and clayey flood plain soils with naturally high groundwater, 2 per cent.

Source:Bristol, Avon Valleys and Ridges Natural Area Profile, Bristol, Avon Valleys and Ridges Countryside Character Area Description

The main grades of agricultural land in the NCA are broken down as follows (as a proportion of total land area):

Agricultural Land Classification	Area (ha)	Percentage of NCA
Grade 1	4,108	5
Grade 2	5,520	7
Grade 3	51,134	61
Grade 4	5,773	7
Grade 5	35	<1
Non-agricultural	2,393	3
Urban	15,188	18

Source: Natural England (2010)

Maps showing locations of sites can be found at:
http://magic.defra.gov.uk – select 'Landscape' (shows ALC and 27 types of soils).

3. Key waterbodies and catchments

3.1 Major rivers/canals

The following major rivers/canals (by length) have been identified in this NCA.

Name	Length in NCA (km)
River Avon	16
River Frome	33
River Kenn	<1
River Yeo	9

Source: Natural England (2010)

Please note: other significant rivers (by volume) may also occur. These are not listed where the length within the NCA is short.

The River Avon cuts a steep-sided valley through the area from the east. The Frome flows southwards to join it at the centre of Bristol and the Chew follows a tortuous course to join it near Keynsham. Other streams and rivers in the south-east flow eastwards to join the Avon outside the character area and the Yeo on the south-western edge flows directly to the sea.

3.2 Water quality

The total area of Nitrate Vulnerable Zone is 22,823 ha or 27 per cent of the NCA.

Source: Natural England (2010)

3.3 Water Framework Directive

Maps are available from the Environment Agency showing current and projected future status of water bodies
http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=_e

4. Trees and woodlands

4.1 Total woodland cover

The NCA contains 6,636 ha of woodland, 8 per cent of the total area, of which 1,690 ha is ancient woodland. The Forest of Avon Community Forest, one of twelve Community Forests established to demonstrate the contribution of environmental improvement to economic and social regeneration, covers 49,359 ha or 59 per cent of this NCA.

Source: Natural England (2010) and Forestry Commission (2011)

4.2 Distribution and size of woodland and trees in the landscape

The most extensive areas of woodland, which are ash-maple dominated and of high nature-conservation interest, lie between Congresbury and the Avon Gorge, and on the Failand Ridge. They are of international significance. Elsewhere, the woodlands are much smaller and fragmentary. They are often on the steeper land, with their great variety reflecting the overall complex geology.

Small-leaved lime is a tree which is only ever found on ancient woodland sites and it is a characteristic tree of many of the woods on ridges to the south and south-east of Bristol. Damper woods or areas along the edges of streams may support more moisture tolerant species such as willow and alder. This type of woodland is not very common but small areas are found fringing Blagdon and Chew Valley lakes. Where more acidic conditions prevail sessile oak and birch occur because of their preference for such soils for example at Bickley Wood. One of the finest ancient woodlands within this NCA is Leigh Woods near Bristol. This supports a high number of restricted plant species including nationally rare and endemic whitebeam species. Part of the woodland is a National Nature Reserve and part has been put forward as a Candidate Special Area of Conservation under the Habitats Directive 1992. Another outstanding wood is Lower Woods at Wickwar in the far north of the NCA. These woods are the most extensive ancient woodlands in the area with the SSSI extending to 280 ha.

Source: Bristol, Avon Valleys and Ridges Natural Area Profile, Bristol, Avon Valleys and Ridges Countryside Character Area Description

4.3 Woodland types

A statistical breakdown of the area and type of woodland found across the NCA is detailed below.

Area and proportion of different woodland types in the NCA (over 2 ha)

Woodland type	Area (ha)	Percentage of NCA
Broadleaved	5,288	6
Coniferous	588	1
Mixed	357	<1
Other	403	<1

Source: Forestry Commission (2011)

Area and proportion of ancient woodland and planted ancient woodland sites (PAWS) within the NCA.

Woodland type	Area (ha)	Percentage of NCA
Ancient semi-natural woodland	1,237	1
Planted ancient woodland sites (PAWS)	453	<1

Source: Natural England (2004)

5. Boundary features and patterns

5.1 Boundary features

In the flatter land and on the downland, hedgerows are low and often intermittent. In the valleys and steeper slopes of the south-west, overgrown hedgerows predominate. They are often species-rich, with frequent ash and oak, although pure hazel hedgerows are a feature of the area north of the Mendip Hills.

Source: Countryside Character Area description; Countryside Quality Counts (2003))

5.2 Field patterns

While the flatter land and downland consist of large fields the valleys and steeper slopes predominantly in the south-east have irregular fields.

Source: Bristol, Avon Valleys & Ridges Countryside Character Area description; Countryside Quality Counts (2003)

6. Agriculture

The following data has been taken from the Agricultural Census linked to this NCA.

6.1 Farm type

The area has a mixed character. The main farm types are: grazing livestock lowland, 331 farms; dairy, 112 farms. Other farm types present include cereals, 103 farms; horticulture, 64 farms; mixed farms, 61 farms; specialist poultry, 28 farms; general cropping, 15 farms; and specialist pigs, 11 farms.

Between 2000 and 2009, most farm types saw a reduction in the number of holdings. The greatest was in dairy by 85 holdings or 43 per cent followed by mixed farms at 13 holdings or 18 per cent. Only two farm types saw an increase, other types by 22 holdings or 7 per cent and specialist poultry by 12 holdings or 75 per cent.

Source: Agricultural Census, Defra (2010)

6.2 Farm size

In terms of numbers of holdings, farms between 5 and 20 ha are the commonest farm size with 343 holdings. The greatest coverage is by farms over 100 ha at 24,292 ha. Between 2000 and 2009, all farm sizes saw a reduction in the number of holdings apart from those above 100 ha which saw an increase of 12. The greatest fall was in farms between 20 and 50 ha where there was a reduction of 36 holdings.

Source: Agricultural Census, Defra (2010)

6.3 Farm ownership

Owned land makes up 68 per cent of total farm area, while the remainder is tenanted. There has been a slight decrease in both owned land by 3 per cent and land held in tenancy by 1 per cent over the 2000 to 2009 period.

2009: Total farm area = 46,251 ha; owned land = 31,376 ha
2000: Total farm area = 44,740 ha; owned land = 32,198 ha

Source: Agricultural Census, Defra (2010)

6.4 Land use

The commonest crop type by far is grass and un-cropped pasture at 32,512 ha or 70 per cent of the total farmed area, followed by cereals at 7,377 ha or 16 per cent. Between 2000 and 2009, several crop types saw a decline. The largest by hectarage was cereals which fell by 261 hectares. Grass and un-cropped land increased by 1,120 ha and oilseeds and other arable crops increased by 450 ha and 314 ha respectively.

Source: Agricultural Census, Defra (2010)

6.5 Livestock numbers

The most numerous livestock is cattle with 55,300 animals followed by sheep at 41,000 then pigs at 17,700. During the period 2000 to 2009, the numbers of all livestock fell. The largest reduction was in pigs with 16,600 animals followed by sheep with 10,600 animals and cattle with 3,400.

Source: Agricultural Census, Defra (2010)

6.6 Farm labour

Most farms are run by principal farmers, but 47 are run by salaried managers. The numbers of all farm workers declined markedly between 2000 and 2009. Principle farmers fell by 113, salaried managers by 33, full time workers by 246, part-time workers by 364 and casual/gang workers by 134.

Source: Agricultural Census, Defra (2010)

Please note: (i) Some of the Census data are estimated by Defra so may not present a precise assessment of agriculture within this area (ii) Data refers to commercial holdings only (iii) Data includes land outside of the NCA where it belongs to holdings whose centre point is recorded as being within the NCA.

7. Key habitats and species

7.1 Habitat distribution/coverage

Ancient woodland is found throughout this NCA in small patches but has major concentrations at Leigh Woods, to the north-east of Congresbury, Kings and Urchin Wood SSSI, and at Lower Woods SSSI near Wickwar. The central part of this NCA is dominated by the large urban area of Bristol with satellite settlements such as Nailsea to the south-west and Yate/Chipping Sodbury to the north-east. 'Green spaces' within urban areas have an increased importance for a number of reasons and particularly so within the large urban setting of Bristol.

This area has a number of significant open water features together with some wildlife rich waterways. Important parklands of conservation value include Dyrham Park, Doddington House, Blaise Castle and Ashton Court.

The Avon Gorge has natural cliffs and quarry exposures of carboniferous limestone, which are of great geological interest and together with the screes, scrub, pockets of grassland and adjacent woodland, support an exceptional number of nationally rare and scarce plant species.

Neutral grasslands of interest can be found in the fields fringing Blagdon and Chew Valley Lakes, at Dundry Slopes and Stockwood open space, and at fields in the vicinity of Lower Woods, Wickwar.

Limestone grassland has a very limited distribution within this NCA. It is more characteristic of the adjacent areas of the Mendips and Cotswolds.

Source: Bristol, Avon Valleys and Ridges Natural Area Profile

7.2 Priority habitats

The Government's new strategy for biodiversity in England, Biodiversity 2020, replaces the previous Biodiversity Action Plan (BAP) led approach. Priority habitats and species are identified in Biodiversity 2020, but references to BAP priority habitats and species, and previous national targets have been removed. Biodiversity Action Plans remain a useful source of guidance and information. More information about Biodiversity 2020 can be found at; www.naturalengland.org.uk/ourwork/conservation/biodiversity/protectandmanage/englandsbiodiversitystrategy2011.aspx.

The NCA contains the following areas of mapped priority habitats (as mapped by National Inventories). Footnotes denote local/expert interpretation. This will be used to inform future national inventory updates.

Priority habitat	Area (ha)	Percentage of NCA
Broadleaved mixed and yew woodland (Broad Habitat)	3,619	4
Reedbeds	903	1
Lowland meadows	615	1
Coastal and flood plain grazing marsh	563	1
Lowland calcareous grassland	246	<1
Lowland dry acid grassland	87	<1
Purple moor grass and rush pasture	65	<1
Maritime cliff and slope	43	<1
Lowland heathland	12	<1
Mudflats	8	<1

Source: Natural England (2011)

Maps showing locations of priority habitats are available at:

- http://magic.defra.gov.uk – select 'Habitats and Species/Habitats'

7.3 Key species and assemblages of species

- Maps showing locations of some key species are available at: http://magic.defra.gov.uk – select 'Habitats and Species/Habitats'

- Maps showing locations of S41 species are available at: http://data.nbn.org.uk/

8. Settlement and development patterns

8.1 Settlement pattern

The settlement pattern is probably at its simplest on the limestone areas. Here, villages clustered around the scarpfoot springs and locally in the lower parts of the combes. Farmsteads occur on the ridge tops where they are mainly contemporary with enclosure in the 18th and 19th centuries, but they are also found in sheltered sites lower down. Villages are more widespread in the clay vales as are scattered farmsteads and hamlets linked by a complex network of lanes and trackways. Many of the villages are tightly clustered around a church, but settlements like Timsbury are more straggling. In the former mining areas the settlements are interspersed with rows of cottages and isolated houses strung out along minor roads. Small towns like Paulton and Norton-Radstock have been formed by the spread of the mining industry in contrast to the ancient settlements like Pucklechurch and Thornbury clustered around a church on higher ground. Some areas are exceptions to the generally dense settlement pattern, notably the high ridges, the downland, the Frome valley and parts of the land below the Cotswold scarp.

Source: Bristol, Avon Valleys and Ridges Countryside Character Area description; Countryside Quality Counts (2003))

8.2 Main settlements

The main settlements in the NCA are: Bristol, Portishead, Clevedon, Yate, Midsomer Norton, Nailsea, Keynsham and Thornbury. The total estimated population for this NCA, derived from ONS 2001 census data, is: 839,103.

Source: Bristol, Avon Valleys and Ridges Countryside Character Area description; Countryside Quality Counts (2003)

8.3 Local vernacular and building materials

There is much variation in the building stone used across the area, for instance between the sandstone in the north and the white, rather bleak Lias limestone in the south-east within the Norton-Radstock area. With a wide choice of attractive materials, including Bath Stone and Cotswold Stone, it is hardly surprising that many of the

mansions, manor houses and churches are fine buildings in mellow tones but there are also unspoilt village and town streets such as the centre of Chipping Sodbury.

Source: Bristol, Avon Valleys and Ridges Countryside Character Area description; Countryside Quality Counts (2003)

9. Key historic sites and features

9.1 Origin of historic features

The high ground in the west and south of the area was settled at an early date. There is good evidence of Neolithic activity, for example the long barrows and stone circle at Stanton Drew. The ridges continued to be of importance through the Iron Age not least as the sites of hillforts, of which Cadbury Hill is the best known. The lower-lying clay vales, too, had attracted settlement but it is likely that the heavier ground, for instance along the Frome Valley, was not cleared until later.

By Roman times, many parts of the area had been settled for a long time and the importance of the Avon was evident from the port at Sea Mills. Villas lay either side of the Avon valley and on the fertile soils north of the Mendip Hills. After the Romans left, significant 'Dark Age' settlements were present on the eastern edge. The Saxon take-over occurred in the 6th century and the impressive earthworks of the Wansdyke cutting across the ridges south of Bristol date from this era. By the later Saxon period, there were important centres at Pucklechurch, Chew and elsewhere and the town of Bristol was already established by the time of the Norman Conquest. During the Middle Ages, open fields surrounded the frequent villages, interspersed with patches of common and woodland. There was, however, extensive open downland on the western limestone and a royal forest lay around Kingswood. Bristol grew rapidly, not least as a centre for the cloth industry and as a port, and was one of the great towns of medieval England. Lesser towns like Thornbury and Chipping Sodbury also prospered. Following the 14th century disasters and population decline, open fields began to be enclosed, but many remained in use in the north of the area and much of the open downland was unenclosed until the 19th century.

A coal industry was present in the Middle Ages but it did not really become significant until the 18th century. It always consisted of small pits dispersed across the countryside, often fuelling local industries like the brass foundry at Keynsham. They were active well into the present century, but there was rapid decline following nationalisation and the last pit closed in 1973. Today, most of the obvious evidence has disappeared and the tips have been largely reclaimed. In the post-medieval period, Bristol expanded to become Britain's second port. In the 18th and 19th centuries the city prospered and expanded on the basis of its trade, engineering and other industries. The wealth that it generated is evident in the parks and mansions that surround the city. In the 20th century Bristol expanded even more rapidly to include the Avonmouth complex. Residential, commercial and light industrial areas extended into the surrounding countryside and major new roads were developed. The growth has affected the whole area and many of the outlying settlements like Yate developed both as their own employment centres and as dormitories of Bristol.

Source: Countryside Quality Counts Draft Historic Profile, Countryside Character Area description

9.2 Designated historic assets

This NCA contains the following numbers of designated heritage assets:

- 21 Registered Parks and Gardens covering 1,723 ha.
- 0 Registered Battlefield/s covering 0 ha.
- 117 Scheduled Monuments.
- 4,822 Listed Buildings.

Source: Natural England (2010)

More information is available at the following address:
http://www.english-heritage.org.uk/caring/heritage-at-risk/

http://www.english-heritage.org.uk/professional/protection/process/national-heritage-list-for-england/

10. Recreation and access

10.1 Public access

- 1 per cent of the NCA 935 ha is classified as being publically accessible.
- There are 2,161 km of public rights of way at a density of 2.6 km per km2.
- There is 1 National Trail, the Cotswold Way, within the NCA covering 2 km within its boundaries.

Sources: Natural England (2010)

The table below shows the breakdown of land which is publically accessible in perpetuity:

Access designation	Area (ha)	Percentage of NCA
National Trust (Accessible all year)	127	<1
Common Land	749	1
Country Parks	511	1
CROW Access Land (Section 4 and 16)	1,221	1
CROW Section 15	799	1
Village Greens	76	<1
Doorstep Greens	3	<1
Forestry Commission Walkers Welcome Grants	612	1
Local Nature Reserves (LNR)	370	<1
Millennium Greens	12	<1
Accessible National Nature Reserves (NNR)	142	<1
Agri-environment Scheme Access	54	<1
Woods for People	1,608	2

Sources: Natural England (2011)

Please note: Common Land refers to land included in the 1965 commons register; CROW = Countryside and Rights of Way Act 2000; OC and RCL = Open Country and Registered Common Land.

11. Experiential qualities

11.1 Tranquillity

Based on the CPRE map of Tranquillity (2006) much of the NCA is heavily disturbed particularly around Bristol and its environs. Although little of the NCA is truly tranquil the area to the south of Bristol around the Chew and Yeo Valleys show some of the least disturbance.

A breakdown of tranquillity values for this NCA are detailed in the table below:

Tranquillity	Score
Highest Value within NCA	28
Lowest Value within NCA	-86
Mean Value within NCA	-19

Sources: CPRE (2006)

More information is available at the following address:
http://www.cpre.org.uk/resources/countryside/tranquil-places

11.2 Intrusion

The 2007 Intrusion Map (CPRE) shows the extent to which rural landscapes are 'intruded on' from urban development, noise (primarily traffic noise), and other sources of visual and auditory intrusion. This shows that most of the NCA suffers considerable intrusion. A breakdown of intrusion values for this NCA is detailed in the table below.

Intrusion category	1960s (%)	1990s (%)	2007 (%)	Percentage change (1960s-2007)
Disturbed	36	61	59	23
Undisturbed	53	27	21	-32
Urban	12	12	20	8

Sources: CPRE (2007)

Notable trends from the 1960s to 2007 are the considerable increase in areas subject to disturbance.

More information is available at the following address:
http://www.cpre.org.uk/resources/countryside/tranquil-places

12 Data sources

- British Geological Survey (2006)
- Natural Area Profiles, Natural England (published by English Nature 1993-1998)
- Countryside Character Descriptions, Natural England (regional volumes published by Countryside Commission/Countryside Agency 1998/1999)
- Joint Character Area GIS boundaries, Natural England (data created 2001)
- National Parks and AONBs GIS boundaries, Natural England (2006)
- Heritage Coast Boundaries, Natural England (2006)
- Agricultural Census June Survey, Defra (2000,2009)
- National Inventory of Woodland & Trees, Forestry Commission (2003)
- Countryside Quality Counts Draft Historic Profiles, English Heritage (2004)*
- Ancient Woodland Inventory, Natural England (2003)
- BAP Priority Habitats GIS data, Natural England (March 2011)
- Special Areas of Conservation data, Natural England (data accessed in March 2011)
- Special Protection Areas data, Natural England (data accessed in March 2011)
- Ramsar sites data, Natural England (data accessed in March 2011)
- Sites of Special Scientific Interest, Natural England (data accessed in March 2011)
- Detailed River Network, Environment Agency (2008)
- Source protection zones, Environment Agency (2005)
- Registered Common Land GIS data, Natural England (2004)
- Open Country GIS data, Natural England (2004)
- Public Rights of Way Density, Defra (2011)
- National Trails, Natural England (2006)
- National Tranquillity Mapping data, CPRE (2007)
- Intrusion map data, CPRE (2007)
- Registered Battlefields, English Heritage (2005)
- Record of Scheduled Monuments, English Heritage (2006)
- Registered Parks and Gardens, English Heritage (2006)
- World Heritage Sites, English Heritage (2006)
- Incorporates Historic Landscape Characterisation and work for preliminary Historic Farmstead Character Statements (English Heritage/Countryside Agency 2006)Detailed River Network, Environment Agency (2008)

Please note all figures contained within the report have been rounded to the nearest unit. For this reason proportion figures will not (in all) cases add up to 100%. The convention <1 has been used to denote values less than a whole unit.

Supporting document 2: Landscape change

Recent changes and trends

Trees and woodlands

- In 1999 about 12 per cent of the established eligible National Inventory of Woodland and Trees woodland stock was covered by a Woodland Grant Scheme management agreement, by 2003 this had risen slightly to 15. About a quarter (1,690 ha) of the woodland cover is on an ancient woodland site, the proportion of these sites covered by a Woodland Grant Scheme agreement increased from 11 per cent in 1999 to 18 per cent by 2003.

- Currently about 18 ha of traditional orchard are being maintained and restored through Environmental Stewardship agreements. Interest in planting community orchards has also increased, for example the Forest of Avon Trust has assisted a number of new community orchards to be planted.

Boundary features

- The estimated boundary length for the NCA is about 5,277 km. Total length of agreements between 1999 and 2003 was equivalent to about 3 per cent of this total including, hedgerow management and restoration (68 km), stone wall restoration (4 km) suggesting the resource had been neglected.

- In 2011, 15 per cent (873 km) were under environmental stewardship agreements including 33 km of ditches, 810 km of hedgerows and 15 km of stone wall, this is largely due to entry level agreements but is a significant increase from the 2003 figures suggesting a general improvement in the condition of boundary features.



Large scale quarrying of Carboniferous Limestone in South Gloucestershire.

Agriculture

- Livestock farming is predominant in this area, 50 per cent of holdings in 2000 and 46 per cent of holdings in 2009 being classed as livestock farms. Within this, grazing dominates, remaining relatively stable at 30 per cent and 32 per cent in 2000 and 2009 respectively. Dairying, however, was substantially higher in 2000 (17 per cent) than 2009 (11 per cent).

- The cereal, general cropping and horticulture figures have remained largely stable comparing 2000 with 2009 data.

- Land holding sizes are generally larger in 2009 compared with 2000, there being more than 100 ha, the total number of holdings has fallen but an extra 1,511 ha is covered by holdings demonstrating a move in the industry to fewer larger farms.

Settlement and development

- Many rural settlements are now strongly influenced by modern development and infill. Older village character remains more strongly defined towards the outer part of the area. Research showed that between 1999 and 2003, outside urban and fringe areas there were moderately high rates of development in terms of the share of national build. There was some urbanisation with development concentrated locally, such as around Bristol (Mangotsfield and Stoke Gifford) and the small towns and villages to the north, Nailsea, Bristol Airport and the open countryside to the south. These changes diluted the historic character of the area.

- More recently, continued development along the motorway corridors, particularly at Cribbs Causeway and Aztec West has dominated the open, undulating countryside around them which has little tree cover.

Semi-natural habitat

- The NCA contains approximately 6,225 ha of semi-natural priority (BAP) habitat, of which 2,083 ha (34 per cent) is designated as SSSI. In 2012, 75 per cent of SSSI were in favourable condition, 20 per cent were unfavourable recovering, 2 per cent were unfavourable no change and 3 per cent were unfavourable declining.

- Countryside Stewardship uptake for semi-natural features was above the national average up to 2003. The most extensive annual agreements in 2003 were for lowland pastures on neutral/acid soils (956 ha) and lowland hay meadows (466 ha) (together they represent the lowland meadow priority habitat). 2012 data shows 641 ha of neutral, calcareous or acid grassland currently under species-rich grassland management or restoration options in Higher Level Stewardship. Direct comparison of the figures is difficult due to the way the grassland habitats have been grouped in the different schemes, but management of grassland remains one of the more popular options in this area.



Example farm at Whitfield. A planned 1840s farmstead in a replanned regular enclosure landscape.

Historic features

- In 1918 about 3 per cent of the NCA was historic parkland. By 1995 it is estimated that 44 per cent had been lost. In 2003 about 49 per cent of the remaining parkland was covered by an Historic Parkland Grant, and about 32 per cent was included within an agri-environment scheme. About 55 per cent of historic farm buildings remained unconverted. About 91 per cent were intact structurally. Although many historic farm buildings have been lost, the character of parkland landscape has largely been maintained.

- There are a number of historic buildings and scheduled ancient monuments in this NCA that are on the English Heritage 2011 risk register including, for example, several sections of the Wansdyke that are at risk from arable ploughing. 136 ha of the NCA currently have archaeologically sensitive Higher Level Stewardship options applied to them.

Coast and rivers

- The coastal section of this NCA lies between Portishead and Clevedon and is largely composed of north-west facing Carboniferous Limestone cliffs with a narrow intertidal width; therefore there is little coastal change.

- The biological river water quality and the chemical water quality in 1995 were predominantly excellent and this status was maintained in 2003.

- The ecological status of rivers in the NCA in 2009 ranges from good through to bad, the Ladden Brook being classed as bad, the majority being moderate or poor.

Minerals

- The impact of quarrying on the character of the area is minimal and Bristol and Bath and North East Somerset lack opportunities for mineral extraction.

- In South Gloucestershire,[6] Carboniferous Limestone continues to be the most important mineral resource, being utilised for roadstone and construction aggregate. The number of quarries has not changed over the last 10 years, five quarries remain active. Two of these are likely to exhaust their reserves before the end of the core strategy at the end of 2026 and new sites may be required. Clay is extracted at Almondsbury, and Shortwood for engineering bricks and pipes.

- Within North Somerset, the opportunity for mineral development is largely within the Carboniferous Limestone, currently three quarries are active.[7]

Drivers of change

Climate change

- Climate change is likely to result in periods of heavy rain that may cause more frequent flood events, increased flooding of settlements and transport infrastructure. Increased surface water run-off is likely to overload the current storm drainage systems in the urban areas.

- Increase in summer temperatures could exacerbate the urban heat island effect with possible impacts on the health and wellbeing of urban residents and increasing energy consumption, from both business and residential premises, to power more air conditioning units.

[6] South Gloucestershire Core Strategy, South Gloucestershire Council (December 2011)

[7] North Somerset Core Strategy, North Somerset Council (April 2012)

- Six per cent of the area is wooded and changes to seasonal temperature and rainfall may result in changes to tree productivity. For broadleaved species, although a drop in productivity is likely in the south-east of England, productivity elsewhere may increase. Suitability of the climate for new non-native species could alter woodland composition and potentially result in the loss of important rare and scarce species, especially within the Avon Gorge.

- Increased storminess, drought and prevalence of pests and diseases such as phytophthora may result in the loss of ancient woodlands and mature and/or veteran trees, especially parkland trees.

- A longer growing season could potentially lead to double cropping with impacts on soil condition due to increased cultivation.

- More frequent droughts leading to increases in water demand for crop growth and drying out and erosion of soils.

- Species migration and loss of small or isolated habitats and populations.

Other key drivers

- The four unitary authorities within the West of England are focussing future development within urban areas and utilising brownfield sites to avoid green field development, Bristol plans no urban extensions but South Gloucestershire is proposing significant development on the north (majority housing) and eastern (mostly employment) fringes of Bristol and expansion at Yate and Thornbury which may have landscape impacts.

- Regeneration of former industrial sites within the area, for example Filton airfield, which is allocated for mixed development with an emphasis on housing. Three of the unitary authorities within the west of England have agreed a green infrastructure strategy and all development will provides an opportunity to incorporate provisions for biodiversity and green infrastructure.

- There is likely to be increased pressure for food production in the future as a result of a national drive for greater self-sufficiency in food. There is a trend towards fewer larger farms. This may result in increased pressure on species-rich permanent grassland and ecosystem services such as water availability and water quality but may provide an opportunity to encourage low water consumption devices to be installed.

- Population growth in Bristol has been high since the 2001 census with an increase of 13.2 per cent (2.5 times higher than the estimated increase in Great Britain as a whole)[8] and an increase has also been experienced in the other unitary authorities of the west of England. Such increases in population drive development pressures and require sensitive, active management for recreation to protect the archaeological features, the historical built environment, biodiversity and geodiversity that visitors and residents value. There is also a need to protect the cumulative impacts of the population increase on ecosystem services such as water availability and water quality.

- The West of England joint transport plan includes a number of major schemes, for example the South Bristol Link which will alter the setting of south-west Bristol. Proposed plans to expand Bristol International Airport will also affect the tranquillity of the surrounding area.

- The Carboniferous Limestone continues to be quarried and there is continuing pressure for expansion.

[8] The Population of Bristol April 2012, Bristol City Council (2012)

Supporting document 3: Analysis supporting Statements of Environmental Opportunity

The following analysis section focuses on a selection of the key provisioning, regulating and cultural ecosystem goods and services for this NCA. These are underpinned by supporting services such as photosynthesis, nutrient cycling, soil formation and evapo-transpiration. Supporting services perform an essential role in ensuring the availability of all ecosystem services.

Biodiversity and geodiversity are crucial in supporting the full range of ecosystem services provided by this landscape. Wildlife and geologically-rich landscapes are also of cultural value and are included in this section of the analysis. This analysis shows the projected impact of Statements of Environmental Opportunity on the value of nominated ecosystem services within this landscape.



Clifton Suspension Bridge, a popular tourist destination in Bristol, over the Avon Gorge.

Statement of Environmental Opportunity	Ecosystem service																	
	Food provision	Timber provision	Water availability	Genetic diversity	Biomass energy	Climate regulation	Regulating water quality	Regulating water flow	Regulating soil qulaity	Regultating soil erosion	Pollination	Pest regulation	Regulating coastal erosion	Sense of Place / inspiration	Sense of history	Tranquility	Recreation	Biodiversity	Geodiversity
SEO 1: Conserve and manage the distinction between small rural settlements and the densely urban City of Bristol, the urban fringe transitional zone and the commuter settlements; and ensure that new development is sensitively designed to contribute to settlement character, reduce the impact of the urban fringe and provide well-designed green infrastructure to enhance recreation, biodiversity and water flow regulation.	↔ **	↔ **	↘ *	↗ *	o	↗ *	↗ **	↗ **	o	o	↗ **	↗ **	o	↑ ***	↗ **	↗ **	↑ ***	↗ **	↗ **
SEO 2: Protect and manage the strong sense of history and many historical assets ranging from prehistoric barrows to the mining legacy, as well as the Avon Gorge and the many varied geological exposures within this geologically significant landscape, to enable recreation and access, education, tourism and continued enjoyment of the heritage of the area.	↔ **	↔ **	↗ *	↗ **	o	↗ **	↗ **	↗ **	↗ **	↗ **	↗ **	↗ **	o	↑ ***	↑ ***	↗ **	↗ **	↑ ***	↑ ***
SEO 3: Conserve and sustainably manage the gentle clay vales and limestone ridges and downs of the rural agricultural landscape and enhance the network of semi-natural habitats, linking them together to create a coherent and resilient ecological network, enabling ecosystems to adapt both to climate change and for the benefits to landscape, biodiversity, water flow, water quality, soil quality, soil erosion, rural heritage and culture.	↗ *	↗ *	↗ **	↗ **	↗ *	↗ **	↑ **	↑ ***	↑ **	↑ ***	↑ **	↑ **	↔ **	↑ **	↗ **	↑ **	↗ **	↑ **	↗ *
SEO 4: Protect and manage the landscape, heritage and biodiversity associated with the Avon River corridor, other river valleys and lakes, planning for a landscape-scale enhancement of wetlands, wet woodland and semi-natural grasslands along river flood plains for the benefits to biodiversity, climate regulation, water quality and flooding mitigation.	o	↗ *	↑ **	↗ *	o	↗ **	↑ ***	↑ ***	↑ **	↑ ***	↗ **	↗ **	↗ *	↗ **	↗ *	↗ **	↗ ***	↑ **	↗ **

Note: Arrows shown in the table above indicate anticipated effect on service delivery ↑= Increase ↗ = Slight Increase ↔= No change ↘ = Slight Decrease ↓= Decrease.
Asterisks denote confidence in projection (*low **medium***high) ° = symbol denotes where insufficient information on the likely impact is available .

Dark plum = national importance; mid plum = regional importance; light plum = local importance

Landscape attributes

Landscape attribute	Justification for selection
Contrasting landscape of low lying shallow vales, limestone scarps and downland ridges strongly influenced by the complex and diverse geology that is reflected in the many geological SSSI and the diversity of vernacular building stones in use.	■ Complex and diverse geology ranging from early Ordovician to Middle Jurassic in age, and comprised of limestones, mudstones, siltstones sandstones, conglomerates and coal, influenced by several phases of folding and faulting. The area played an import role in the history of the development of geology as a science as William Smith (the 'father of English geology') based some of his founding geological principles upon strata and features exposed within the area. ■ 25 geological SSSI plus an additional 2 of mixed interest. ■ Important fossil bearing strata are visible in some geological exposures for example: fossil fishes at Woodhill Bay; corals, brachiopods and crinoids in the Carboniferous Limestone; Coal Measure plants and insects at Writhlington; high dominance low diversity bivalve assemblages in Late Triassic sediments, underlying the south and the east of Bristol; Lower Jurassic sediments containing rich fauna including ammonites, nautiloids, bivalves, brachiopods, belemnites and marine reptiles such as ichthyosaurs. ■ The mineralogical interests of the NCA lie mainly in small areas of sulphides mineralisation (copper, zinc and arsenic), and the extensive deposits of celestine (stronium sulphate) that occurs in the Mercia Mudstone Group. ■ Local stone such as local ashlar which includes pale yellow Jurassic oolitic limestones, grey Carboniferous and Lias limestones used as building materials, or, in some locations in the north, red or brown sandstone.

Landscape attribute	Justification for selection
Long historic timeline visible in the landscape, historical significance of access to the Severn Estuary through the Avon and its ports.	■ 21 Registered Parks and Gardens covering 1,723 ha, 117 Scheduled Monuments and 4,822 listed buildings. ■ Evidence of Neolithic activity in the long barrows and stone circle at Stanton Drew. ■ Iron-age hill forts, for example Cadbury Hill, and evidence of settlement of lower-lying clay vales. ■ Importance of the port at Sea Mills during the Roman period and evidence of villas either side of the Avon Valley and on the fertile soils north of the Mendip Hills. ■ Significant 'Dark Age' settlements on the eastern edge. ■ The 6th century Saxon Wansdyke cutting across the ridges south of Bristol and important centres at Pucklechurch, Chew and elsewhere by the later Saxon period. ■ Bristol historic port and buildings associated with trade with the colonies since the Tudor era, the wealth that it generated is evident in the parks and mansions that surround the city such as Dyrham Park, Tyntesfield, Dodington House, Blaise Castle and Ashton Court.
Distinct limestone ridges characterised by important extensive ancient woodland and the internationally important and downs.	■ The higher ground and steep scarps of the limestone ridge extend from the Yeo Valley towards Thornbury. The frequently heavily wooded scarp falling steeply away westwards to the levels of the Severn Vale. ■ The limestone ridge cut by the spectacular Avon Gorge on the edge of Bristol, with its cliffs and quarry exposures of Carboniferous Limestone, its screes, species-rich grassland and ancient woodland habitats that support rare and unique species such as the Bristol onion and Bristol rock-cress and grow nowhere else in the UK, and rare whitebeams (Sorbus species) including *S. bristoliensis* and *S. wilmottiana* which are unique to the Avon Gorge. ■ The Avon Gorge is internationally recognised as a European Special Area of Conservation (SAC) under the Habitats Directive 1992 for its 'mixed woodland on alkaline soils associated with rocky slopes (Tilio-Acerion ravine forests) for which this is considered to be one of the best areas in the United Kingdom'. ■ Peregrine falcon and raven nest within the gorge. ■ The limestone to the south forms the distinctive landscape of the Failand Hills with their extensive sometimes panoramic views, which together with the gorge woodlands form the greatest expanse of ancient woodland in the NCA. ■ The Clifton Suspension Bridge, a Grade I-listed building and strong cultural symbol of the City of Bristol.

Landscape attribute	Justification for selection
Contrast between the more densely settled and varied landscape of low lying, shallow vales and the open unsettled limestone scarps and high open downland ridges.	■ Tremendously varied farmed landscape, ranging from large fields with intensive arable cropping to small pastures with dense hedges. ■ On the limestone areas, villages cluster around the scarp foot springs and locally in the lower parts of the combes, with farmsteads occurring on the ridge tops where they are mainly contemporary with enclosure in the 18th and 19th centuries, and also on sheltered sites lower down. ■ Gentle open landscape of the clay vales in the east, with few hedgerow trees, giving way to an intricate field pattern mixed with woodland on the surrounding higher land. Villages are more widespread in the clay vales as are scattered farmsteads and hamlets linked by a complex network of lanes and track ways. Many of the villages are tightly clustered around a church but settlements like Timsbury are more straggling. ■ In the former mining areas, the settlements are interspersed with rows of cottages and isolated houses strung out along the minor roads. Small towns like Paulton and Norton-Radstock, have been formed by the spread of the mining industry in contrast to the ancient settlements like Pucklechurch and Thornbury clustered around a church on higher ground. ■ A rolling landscape of rougher hill-top pastures and deep river valleys containing lusher pastures. Many stone villages and hamlets, and farmsteads linked by narrow hedged lanes to the south-east, merging with the eastern part of the Mendip Hills. ■ Pattern of medieval hedge-bound irregular fields, in the valleys and on steeper slopes (predominantly in the south-east). ■ Traditional stone walls in the shallow broad valleys, farmed Coal Measures and on areas of downland.

Landscape attribute	Justification for selection
Strong contrast between large urban conurbation and rural and historical parkland landscapes.	■ Striking Avon Gorge with urban conurbation of Bristol spreading down to the river at Clifton beneath the suspension bridge. ■ Development along the M4 and M5 corridors, together with the regional shopping centre and major office development north of Bristol, dominate the open, undulating countryside around them which has little tree cover. ■ Clifton Downs and the Failand Ridge with extensive views over the conurbation of Bristol and across the estuary to Wales, or back towards the Chew Valley. ■ On the edge of Bristol, Ashton Court is the grandest of the parks that has used the limestone landforms to create landscaped deer parks and provides a wide range of active recreation pursuits such as kite flying and mountain biking for the populations of Bristol and North Somerset. It is also host to an annual international balloon festival. ■ To the south and east, housing extends to Dundry Hill and is broken by fragments of farmland. While in the north and north-east, development is dispersed across a wide area and the motorways are prominent. Modern residential development, extending as far as Yate, is broken by open farmland.

Landscape attribute	Justification for selection
Semi-natural habitats including neutral and calcareous grassland, wet grassland, open water, species-rich hedgerows, traditional orchards, veteran parkland trees and drystone walls of biodiversity significance.	■ There are 51 SSSI wholly or partly within the NCA covering 2,083 ha, 2 per cent of the area. Twenty-five of these are geological, the remainder mostly cover grassland (calcareous or neutral) and/or ancient woodland features. ■ Lower Woods SSSI near Wickwar is the most extensive ancient woodland in the area, creating a mosaic of ancient woodland and species-rich grassland, with the SSSI extending to 280 ha. Pedunculate oak and ash dominates, with hazel and field maple as an understory. Ground flora species include dog's mercury, bluebell, wood anemone and wood sorrel. ■ Small-leaved lime is a tree which is only ever found on ancient woodland sites and it is characteristic of many of the woods on the limestone ridges to the south and south-east of Bristol. ■ Damper willow and alder woodland is found fringing Blagdon and Chew Valley lakes. On the more acidic soils, such as at Bickley Wood, sessile oak and birch predominate. ■ Diverse landscape of woodland edge, hedgerows, grazed pasture and watercourses with many caves and old buildings providing hibernation sites, making the area highly important for greater and lesser horseshoe bats, particularly around Ashton Court, Tyntesfield, the Failand Ridge, Barrow Gurney, Dundry Hill and Lower Woods. ■ Particularly fine examples of neutral grassland (MG5, lowland meadow) around Chew Valley and Blagdon lakes, Ashton Court, Butcombe, Nempnett Thrubwell and Walton Common. ■ Wet grassland and wet woodland associated with the river flood plains and the biodiversity value of the rivers themselves. ■ Species-rich hedgerows and drystone walls act as corridors for biodiversity across the landscape, connecting semi-natural habitats, grassland being of particular relevance to the walls, which also support lichens, bryophytes, vascular plants and invertebrates, while hedgerows can form an important part of the woodland and grassland network including linking traditional orchard and wood pasture and parkland. Drystone walls can also be of landscape, geological, cultural, biodiversity and historical interest. Orchards are concentrated on the south facing slopes to the north of the Chew Valley. ■ Chew Valley Lake SPA, internationally important for shoveler ducks and nationally important numbers of gadwall, tufted duck and teal. Blagdon Lake, also important for overwintering wildfowl, is an SSSI, supporting a diverse invertebrate fauna, particularly snails and water beetles. Aquatic and emergent plants and the surrounding species-rich lowland meadow add to the nature conservation value of the area.

Landscape attribute	Justification for selection
Good provision of rights of way and access land.	■ There are 2,161 km of public rights of way, 2 km of the Cotswold Way National Trail and parts of the Bristol to Brecon, Bristol and Bath Railway, Bristol-City-Triangular Walk, the Celtic Way, Severn Way, Monarch's Way, Frome Valley Walkway and Samaritans Way South-West (Bristol to Lynton) long distance paths within the NCA. ■ Good provision of cycle paths; Bristol also recognised as Britain's first cycling city.

Landscape opportunities

- Maintain, restore and consolidate areas of semi-natural grasslands that have an important role in accentuating underlying geology and in maintaining a sense of locality, to create a functional and resilient grassland network. Protect and manage species-rich lowland calcareous and neutral grasslands (priority habitat lowland meadow) and wet meadows and pastures for the species they support. Road verges also play an important part in linking grasslands.

- Retention of semi-natural grasslands is also important in maintaining ridge and furrow, which is a distinctive landscape feature, and other buried archaeology and historic earthworks.

- Continue to encourage the conservation and active management of existing woodland including ancient woodland, mixed woodland blocks, and shelter belts and promote new planting in accordance with the objectives of the Bristol and Avon Community Forest for their contribution to the landscape, recreation and biodiversity. Bolster the woodland network by managing hedgerows appropriately to link woodland, with other wooded habitats such as traditional orchards and wood pasture and parkland.

- Manage traditional orchards to ensure a continuity of deadwood and rot holes and increase the variability of age structure of orchard trees. Improve the condition of the underlying grassland to enhance the lowland meadow resource. Restore or maintain traditional orchard buildings such as cider houses, which contribute to the history and cultural associations of orchards. Promote educational opportunities and visitor interpretation associated with the cultural features of traditional orchards.

- Manage and restore field boundaries including hedgerows, hedgerow trees and drystone walls, and drainage ditches in keeping with local styles and management traditions.

- Plan for increasing urban fringe pressures on agricultural land by active management and enhancement of green spaces in the urban fringe. This includes farms and agricultural land that all contribute to a network of green spaces and green corridors and to the conservation of landscape and biodiversity in the urban fringe.

- Enhance farmland for farmland birds and rare arable plants.

- Insensitive development and alterations in villages has affected rural character. Residential development pressure, along the M5 corridor and around the Bristol conurbation, has also had an impact. Promote village design statements and neighbourhood plans to help retain rural character.

- Actively manage and improve the quality of sustainable recreational opportunities and associated infrastructure to enable more opportunities for people to be inspired by the downs, country parks and open spaces.

- Manage the continued quarrying of the limestone ridges south of Bristol and plan for continuing pressure for expansion.

- Conserve and provide interpretation for the area's rich and complex industrial history, particularly features associated with the coal industry, rural mills colonial trading and industrialisation.

- Retain the distinctive parkland character of the NCA, with the retention, appropriate management and replacement of parkland trees within a pastoral setting, and maintain distinctive tree lines and groups.

- Conserve ancient and veteran trees in the parkland landscape for the benefit of fauna and flora that depend upon them and their heritage value. Plan for the provision of veteran trees of the future.

- Enhance and protect the river landscape, particularly the River Avon which has the potential to unite the landscape through which it runs. Develop enhancements through landscape-scale approaches to conservation.

- Conserve and protect geological sites and provide physical access and interpretation to improve the understanding of the significance of this area in the development of the history of geology and provide opportunities for sustainable recreation and tourism.



The tidal River Avon at low tide flowing at the bottom of the Avon Gorge below Clifton Suspension Bridge. The Carboniferous Limestone cliffs form the walls of the gorge.

Ecosystem service analysis

The following section shows the analysis used to determine key Ecosystem Service opportunities within the area. These opportunities have been combined with the analysis of landscape opportunities to create Statements of Environmental Opportunity.

Please note that the following analysis is based upon available data and current understanding of ecosystem services. It does not represent a comprehensive local assessment. Quality and quantity of data for each service is variable locally and many of the services listed are not yet fully researched or understood. Therefore analysis and opportunities may change upon publication of further evidence and better understanding of the inter-relationship between services at a local level

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Food provision	Naturally fertile soils Significant areas of livestock grazing Some cereal farming	The NCA supports a wide range of farming, 71 per cent of the land falls within agricultural grades 1 to 3. The low lying clay vales and the fertile soils north of the Mendip Hills are used as a base by Yeo Valley foods (a national dairy producer). Figures from 2009 show that 46,251 ha is covered by commercial farming which is dominated by livestock farming. In terms of animal numbers, cattle lead at over 55,000, followed by sheep at over 41,000 and pigs just under 18,000. Farm type is dominated by livestock grazing at 331 farms, followed by dairy 112 farms, cereal 103 farms. Horticulture is also significant in the area (64 farms).	Regional	The fertile gentle accessible slopes of the low-lying clay vales are the most productive parts of this area. Arable farming in this NCA is largely for animal fodder though there is a concentration of other arable on the flatter lands from Yate and Chipping Sodbury, northwards towards Wickwar. The less accessible steep hillsides and very shallow soils are utilised as short grazed calcareous grasslands by sheep. Dairying is prevalent in the Yeo Valley. The economics of food production mean that the generally small size of holdings within this NCA is at risk of being bought out by larger companies, this may impact the way the landscape is farmed and may lead to impacts on biodiversity and other ecosystem services if more intensive management is used. Small farms are also being bought up by non-farmers and there land leased out to other farmers or for equiculture.	Work with the local farming community to safeguard future food production while enhancing key ecosystem services diversity by exploring management techniques and stocking levels that maintain viable levels of productivity and safeguard biodiversity, water quality, water regulation (flooding), soil erosion and quality, pollination services and genetic diversity. Encourage the purchasing of local produce to benefit climate regulation and local culture.	**Food provision** **Biodiversity** **Regulating water quality** **Regulating water flow** **Regulating soil erosion** **Regulating soil quality** **Pollination** **Genetic diversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Timber provision	Areas of existing woodland	The NCA contains 6,636 ha of woodland (8 per cent of the total area), around a quarter of which (1,690 ha) is ancient woodland. There are 588 ha of coniferous planting.	Local	There is scope for increasing production from the private sector, particularly from broadleaf woodland. Much of this woodland is undermanaged. Bringing woodland into management as well as woodland creation are both key objectives. Increasing production is a target in this NCA but this is likely to be through privately owned woodland as there is only a small amount of Forestry Commission owned land and production here is unlikely to increase as all the woodland is already in management to produce a sustainable yield through the Forest Design Plans.	Opportunities for expansion of woodland including conifer woodland (where appropriate) guided by plans such as the Forest of Avon Plan, Forestry Commission England Corporate Plan and AONB management plans. There is an opportunity to bring some existing woodland throughout the NCA back into management to provide timber though some non-intervention. Management benefits biodiversity, particularly deadwood species.	**Timber provision** **Regulating soil erosion** **Biodiversity** **Regulating water flow** **Sense of place/ inspiration** **Tranquillity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Water availability	Streams and rivers Reservoirs Abstraction Absorptive capacity of semi-natural habitat maintaining more even water release Precipitation over the Cotswolds and Mendip Hills	The main rivers in this NCA are the Avon, the Frome, the Chew and the Congresbury Yeo. There are also three reservoirs: Blagdon Lake, Chew Valley Lake and Cheddar Reservoir (which lies on the boundary with the Somerset Levels and Moors NCA). These reservoirs are fed by rivers and streams emerging from the Mendip Hills making this area a net receiver of water from the neighbouring Mendip Hills NCA. The NCA overlies a mixture of limestone from the Cotswolds and thick, intensively-folded sequence of mudstone and sandstones. There are no major aquifers within the NCA itself but there are several limestone aquifers associated with the Mendips and the Cotswolds just outside of the NCA boundary.[9] The reservoirs supply 1.1 million people and businesses in the Bristol area. The Jurassic aquifers outside of the NCA are a major groundwater source for public water supply, particularly abstracted from the Malmesbury area to supply Bristol. Public water supply is very consumptive and a significant proportion of the water is not returned to the source of supply, while uses such as production of energy (for example. hydropower) and quarry dewatering (both abstractors in this NCA) are non-consumptive and water is returned to the water environment within the NCA.[10]	Regional	While most of the area is classed as having 'no water available' for additional abstraction, meaning that any new abstraction or an increase in an existing abstraction is very likely to have constraints to limit or stop water being abstracted during low flow situation, which may become more frequent with a changing climate. The Frome and a minor groundwater aquifer just south of Bristol have 'water available'. The area around Blagdon Lake and Chew Valley Lake is over licensed[11] and resources are stretched in the Congresbury Yeo at low flows, mainly due to public water supply abstractions. Some of these licenses are subject to hands-off flow conditions that require the abstractor to stop or reduce abstraction if flows in the river reach identified low flow conditions.[12] Further demands on the public water supply through likely predicted increases in population may further exacerbate over abstraction but demand increase from new developments may be off-set by increased efficiency in existing housing and industry. **Continued over...**	Well designed winter water storage reservoirs on farms could help alleviate the levels of abstraction for water used on farmland. Work with Bristol Water to continue to educate consumers about economical use of water. Slow the flow of water across the landscape to maintain more constant river levels through ponds, semi-natural habitat and more naturalised drainage and watercourses. Hedgerows across steeper slopes can also help to slow the flow of water from the land. Support measures to maintain and improve soil structure of tilled soils to increase permeability and water retention by the soil. Work with Bristol Water and other partners to deliver Drinking Water Protected Area actions and ensure agricultural community comply with the Nitrate Vulnerable Zone regulations.	**Water availability** **Food provision** **Biomass energy** **Regulating water flow** **Regulating water quality** **Regulating soil erosion** **Regulating soil quality** **Recreation** **Biodiversity**

[9] Bristol Avon Catchment Abstraction Management Strategy, Environment Agency (2005; URL: http://publications.environment-agency.gov.uk/pdf/GESW1004BIJV-E-E.pdf)

[10] Bristol Avon Catchment Abstraction Management Strategy, Environment Agency (2005; http://publications.environment-agency.gov.uk/pdf/GESW1004BIJV-E-E.pdf)

[11] Brue, Axe and North Somerset Streams Catchment Abstraction Management Strategy, Environment Agency (2008; http://publications.environment-agency.gov.uk/pdf/GESW0506BKVI-E-E.pdf)

[12] Bristol Avon Catchment Abstraction Management Strategy, Environment Agency (2005; http://publications.environment-agency.gov.uk/pdf/GESW1004BIJV-E-E.pdf)

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Water availability continued				**Continued from previous...** To protect existing abstraction licences and the environment, it may be important to ensure all new developments are supplied with water within current abstraction limits rather than increasing abstractions or developing new sources. Chew Valley Lake is an internationally important wildlife site designated as an SPA and Ramsar Site as an important wildfowl habitat.[13] Blagdon and Chew Valley Lakes are eutrophic due to high levels of nutrients in the water. Both lakes are designated as Drinking Water Protected Areas. The catchments which drain to the lakes, and the catchments from which water is pumped/gravity fed to the lakes, have been identified as Safeguard Zones. The Environment Agency is working with Bristol Water, Natural England and other partners to develop Drinking Water Protected Area Safeguard Zone action plans to address the sources of nutrients entering the lakes. The area surrounding each lake is designated a Nitrate Vulnerable Zone under the Nitrates Directive.		

[13] Bristol Avon Catchment Abstraction Management Strategy, Environment Agency (2005; http://publications.environment-agency.gov.uk/pdf/GESW1004BIJV-E-E.pdf)

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Genetic diversity	Orchard fruit varieties	Although not a major fruit producing area, some traditional orchards remain and there are local fruit varieties that originate from this NCA.		Genetic diversity of orchard fruit varieties are important to maintain in order to safeguard food provision, and afford increased resilience to climate change and disease. Examples of local varieties from this NCA include the Bedminster pippin apple and the Bristol cross pear.ww	Maintain collections such as the national fruit collection at Brogdale Farm, Kent and the Perry Pear collection at Hartpury, Gloucestershire. Raise awareness of local varieties and link owners with suppliers. Encourage regeneration and planting of local varieties.	**Genetic diversity** **Climate regulation** **Pollination** **Biodiversity** **Sense of place/ inspiration** **Sense of history**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Biomass energy	Coppice woodland Existing woodland (6 per cent of the NCA)	Currently there is little biomass production in this NCA as most of the productive land area is used for food production. With a woodland cover of 8 per cent this NCA has some potential for the production of biomass by bringing existing woodland back under management and as a by-product of commercial timber production. Hedgerows also provide local opportunities for coppiced timber.	Local	There is some potential for the provision of biomass through bringing some areas of unmanaged woodland back under small-scale coppice management. This may also locally extend to coppiced wood from hedgerow management. There may also be some potential for miscanthus, and short rotation coppice in some areas of the NCA. However, siting is critical due to the potential water use requirements, chemical inputs and affect on soil structure and erosion. Damage to historic features such as field boundaries, parkland and ridge and furrow should also be avoided. For information on the potential landscape impacts of biomass plantings within the NCA, refer to the tables of 'opportunities and optimum sitings for energy crops' on the Natural England website.[14]	Opportunities for short rotation coppice and miscanthus exist in the NCA. There is scope to bring areas of woodland back into traditional coppice for small-scale wood fuel production and benefits to biodiversity. Some hedgerow management could also be included in this.	**Biomass energy** **Climate regulation** **Biodiversity** **Water availability**

[14] URL: www.naturalengland.org.uk/ourwork/farming/funding/ecs/default.aspx

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Climate regulation	Carbon-rich soils, peat soils at Gordano Valley Soil carbon and stable microbial community under permanent pasture Extensive hedgerow networks, traditional orchards, woodland and parkland	The mineral soils of this NCA are generally low in soil carbon especially where they have been under continuous arable cultivation. Carbon sequestration can be increased by organic matter inputs and by reducing the frequency/area of cultivation.. There are significant peat deposits in the Gordano Valley, some of which falls into this area. The combination of woodland, parkland, traditional orchards and hedgerows plays an important part in carbon sequestration. The concentration of permanent pasture contributes through soil carbon storage which would otherwise be released by aerobic microbial activity on exposure of the soil to air through activity such as ploughing. Trees and green infrastructure in the expansive urban environment of Bristol contribute to regulating the urban heat island effect.	Local	The potential for soil carbon sequestration in this NCA is low as there is no active peat deposition; however the peat deposits at Gordano Valley are important carbon stores, as are other permanently saturated wetland soils, due to limited aerobic microbial activity. Peat deposition could potentially be reactivated by altering the management of water at Gordano, however this would affect the features that the site is currently notified and managed for. High concentrations of permanent pasture also retain carbon, an increased proportion of which would be released through microbial action if the soil was ploughed and exposed to air. However, where permanent pasture is grazed by cattle, it can result in release of methane by the animals themselves. Other ruminants such as sheep also release methane but to a lesser extent per animal. Production of inorganic fertilizer is particularly energy intensive and large volumes of greenhouse gases are emitted during production. Soil testing enables the calculation of optimal fertilise application rates, thus reducing excess use of fertiliser, saving energy, money and benefiting water quality. **Continued over...**	Maintain carbon storage particularly peat soils at Gordano Valley. Maintain levels of carbon sequestration through sustainably managing the woodlands and hedgerows of the area. Prevent CO_2 release by maintaining permanent pasture and ensuring it is managed within a sustainable regime. Encourage incorporation of organic matter into cultivated mineral soils to appropriate levels, avoiding overloading that might cause diffuse pollution. Maintaining traditional orchards and wood pasture and parkland, which stores carbon both through the trees themselves and the permanent grassland beneath. Work with the farming community to ensure they have adequate access to soil analysis to enable the calculation of appropriate levels of fertilizer inputs to reduce energy wastage and benefit water quality. Incorporate street trees and green infrastructure into urban design.	**Climate regulation** **Regulating water flow** **Regulating water quality** **Biodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Climate regulation continued				**Continued from previous...** Increasing organic inputs into cultivated mineral soils would increase the overall carbon content of these soils, contributing slightly to carbon storage, soil condition and water retention.		

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water quality	Hedgerows and buffer strips across steeper slopes Permanent grassland particularly low input Semi-natural habitats Appropriate tillage Good livestock management Buffer strips alongside watercourses Diffuse and point source pollution prevention Sustainable urban drainage	Part of the NCA falls within the North Somerset Moors Priority Catchment. The Congresbury Yeo has problems of sedimentation, phosphates, nitrogen enrichment and low dissolved oxygen which have resulted from downwash off the steep slopes of the Mendip Hills and Broadfield Down.[15] The upper Congresbury Yeo catchment is included within a Nitrate Vulnerable Zone (NVZ). Where information is available ground water quality is poor, although there are areas to the south and the south-west where ground water quality is good. In terms of surface waters, there are stretches of the River Avon that have failed to achieve good chemical quality and the lower part of the catchment suffers from Water Framework Directive (WFD) ecological failures (primarily fish failures). Equally parts of the Frome within this NCA are classified as having 'bad' ecological status, failing for fish and phosphate in some waterbodies. This contrasts with tributaries in the upper reaches of the NCA boundary that are at 'good' ecological status, although the other smaller rivers of the NCA generally only have moderate ecological status, including tributaries of the Avon.[16] Grazing is restricted around the Chew and Blagdon reservoirs to prevent contamination of the public water supply.	Regional	Low flows result in deterioration of water quality due to increasing concentrations of nutrients, maintaining and expanding semi-natural habitat will help to slow the flow of water across the landscape, reducing the extremes of peak and low flow events, soil erosion and particulate reaching the watercourses. Semi-natural habitat also reduces the amount of diffuse pollution as they are low or no input areas, protecting aquifers and watercourses. Invasive non-native species such as Himalayan balsam are a problem and can result in exposed soil along the river banks resulting in erosion and increased particulates entering the watercourse. Due to the large urban area covering this NCA, run-off from roads will contribute to the amount of pollution entering the watercourses. Sustainable urban drainage (SUDS) incorporated into new developments can help reduce the amount of pollution reaching rivers as it is held in the particulate matter of the reed beds. SUDS can also provide benefits for biodiversity and contribute to green infrastructure. **Continued over...**	Maintain ecological flow levels in watercourses by managing abstraction, as described above, to avoid over abstraction resulting in low flow levels which will impact ecological status of watercourses. Expand the network of semi-natural wetland habitats adjacent to watercourses including; flood plain grazing marsh, fen and reedbeds, plus creation of grassland buffer strips, restoration of hedgerows across slopes within river catchments. Work with farmers, particularly across the North Somerset Moors catchment, to reduce sources of diffuse agricultural pollution, run-off and soil erosion into watercourses. Work with the farming community to ensure they have adequate access to soil analysis to enable the calculation of appropriate levels of fertilizer inputs to reduce energy wastage and benefit water quality. Work with landowners, the Environment Agency and water companies in addressing point source discharges. **Continued over...**	**Regulating water quality** **Regulating soil erosion** **Biodiversity** **Climate regulation**

[16] Water for Life and Livelihoods, Environment Agency (2009; http://publications.environment-agency.gov.uk/pdf/GEMI0910BSSM-E-E.pdf)

[15] Defra catchment priorities identified under the England Catchment Sensitive Farming Delivery Initiative (URL: www.defra.gov.uk/foodfarm/landmanage/water/csf/documents/catchment-priorities.pdf)

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water quality continued				**Continued from previous...** Priorities, under the catchment sensitive farming initiative for the North Somerset Moors Priority Catchment, are to: protect drinking water supply and reduce levels of nutrients and pesticides in catch waters of Chew Valley Lake; reduce levels of diffuse agricultural pollution arising from livestock and arable farming; minimise sources of run-off and soil-wash entering watercourses; prevent pathways for run-off; and protect receiver watercourses.[17] Although there is some scope for work within the NCA, some of the water quality issues rely on catchment sensitive farming in the part of the catchment outside of this NCA.	**Continued from previous...** Incorporate SUDS into new development to reduce pollution from run-off from urban areas reaching rivers. Work with local authorities and water companies to prevent foul sewer overflows reaching rivers.	

[17] Capital Grant Scheme – Funding Priority Statement 2012/13, Catchment 36: North Somerset Moors, Natural England (date unknown).

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water flow	Rivers and streams Existing semi-natural habitat Sustainable urban drainage Flood protection defences	While there is little or no risk of flooding across most of the NCA, largely due to the flood defence works which have been put in place, there are some areas where flood risk is higher, including parts of the River Avon and the coastal settlements such as Portishead and Clevedon. Problems of flooding largely relate to tide lock flooding and tidal flooding downstream. The NCA contain a large urban component (Bristol and its environs), meaning that excess water does not easily soak into the ground. The defences through Bristol include the Northern Storm Water Interceptor (NSWI), diverting flood flows from the Bristol Frome away from the City into the tidal Avon. There are also smaller diversion channels on the Ashton, Longmoor and Colliters Brooks and the Brislington Brook. The Floating Harbour in the centre of the City has a vital role in protecting the City from combined tidal and fluvial flooding, effectively acting as a large storage area. Tubbs Bottom detention dam was constructed to reduce the risk of flooding to areas downstream on the Bristol Frome. Similar approaches are being investigated in other parts of the NCA.[18] In the wider landscape areas of semi-natural vegetation, woodland, hedgerows etc all contribute to the slowing of run-off which helps mitigate flood water.	Regional	Much of the Avon catchment is in the neighbouring Cotswolds and Avon Vale NCAs meaning that habitat and river management to alleviate flooding would need to be carried out largely in these NCAs to slow the flow of water entering the river. The risk of surface water flooding may increase with more frequent extreme weather events and more regular heavy downpours. Managing the soil quality to maintain or improve its porosity, as well as soft landscaping and SUDS incorporated into new developments, can all help to alleviate surface water flooding. Management of the wider landscape, such as woodland planting, buffer strips, riparian vegetation, and reconnecting rivers with their flood plains can reduce run-off and aid water storage slowing the flow of water from the landscape into watercourses and reducing peak flow events.	Seek to restore semi-natural habitats, thus utilising natural processes to regulate surface water flow across the landscape, particularly wetland habitats including flood plain grazing marsh, fen, reedbeds and wet woodland in the flood plain. Reduce the speed of water flow through river/stream channels through re-profiling and naturalisation of watercourses. Realise opportunities for flood water storage where they are identified. Seek opportunities to incorporate grass buffer strips and restore hedgerows across slopes within river catchments. Improve the quality of cultivated soils to increase water retention and reduce run-off. Work with the Environment Agency, water companies, local authorities, highways and developers to create more sustainable urban drainage and surface water management strategies to reduce the volume of water running directly into drains and therefore into watercourses.	**Regulating water flow** **Regulating water quality** **Biodiversity** **Regulating soil erosion** **Regulating soil quality**

[18] Bristol Avon Catchment Flood Management Plan, Environment Agency (2005; http://publications.environment-agency.gov.uk/pdf/GESW1109BOUS-e-e.pdf)

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil quality	Unimproved pastures Appropriate tillage Appropriate stocking levels	This NCA has 8 main soilscape types: ■ Slightly acid loamy and clayey soils with impeded drainage, covering 31 per cent of the NCA. ■ Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils (14 per cent). ■ Freely draining slightly acid but base-rich soils (13 per cent). ■ Shallow lime-rich soils over limestone (11 per cent). ■ Freely draining slightly acid loamy soils (11 per cent). ■ Slowly permeable seasonally wet acid loamy and clayey soils (8 per cent). ■ Lime-rich loamy and clayey soils with impeded drainage (8 per cent); and ■ Loamy and clayey flood plain soils with naturally high groundwater (2 per cent).	Regional	The slightly acid loamy and clayey soils with impeded drainage (31 per cent) and the slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils (14 per cent) may suffer compaction and/ or capping as they are easily damaged when wet. In turn this may lead to increasingly poor water infiltration and diffuse pollution as a result of surface water run-off. Careful timing of activities is required to reduce the likelihood of soil compaction which will also be helped by an increase in organic matter levels. In the case of the freely draining slightly acid but base-rich soils (13 per cent), where calcareous layers (horizons) are near the surface these help provide some natural resilience and enhanced workability. Some component soils are at risk from topsoil compaction and poaching. Careful management of weak topsoils will help to maintain a good soil structure. Minimum tillage such as direct drilling can work well on some of these soils. Development of iron pans can occur in some soils. Where organic matter is low increasing organic matter inputs can help improve soil structure. **Continued over...**	Support measures which employ minimal tillage and organic matter incorporation into cultivated soils to increase soil organic matter and also relieve soil compaction on a landscape scale. Work with the farming community to achieve appropriate stocking regimes which avoid poaching and reduce erosion. Support measures which increase the volume of organic matter within cultivated soils to improve soil structure and conditions for soil fauna, increasing water infiltration.	**Regulating soil quality** **Regulating soil erosion** **Regulating water quality** **Biodiversity** **Climate regulation**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil quality continued				**Continued from previous...** The lime-rich soils over limestone (11 per cent) are typically shallow and droughty but due to their calcareous nature have a degree of natural resilience. These and the freely draining slightly acid loamy soils (11 per cent)are valuable for aquifer recharge requiring the maintenance of good soil structure (enhanced by increased organic matter content) to aid water infiltration and require the matching of nutrients to needs to prevent pollution of groundwater.		

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil erosion	Hedgerows and buffer strips across steeper slopes Permanent grassland Semi-natural habitats Sustainable systems of arable cultivation Well managed livestock systems	The majority of soils in this NCA are at risk of erosion where management results in loss of stabilising vegetation. The soils with a clay content and impeded drainage and base-rich soils, together making up some 56 per cent of this NCA, are prone to capping and slaking increasing the risks of soil erosion by surface water run-off, especially on steeper slopes. They are easily compacted by machinery or livestock if accessed when wet and need to be managed carefully to reduce risks with careful timing of cultivations and maintenance of vegetation cover. Equally the freely draining slightly acid soils and shallow lime-rich soils are at risk of erosion on moderately or steeply sloping land where cultivated or bare soil is exposed. This is exacerbated where organic matter levels are low after continuous arable cultivation or where soils are compacted. Indeed the only soils not susceptible to erosion are the slowly permeable and flood plain soils. This susceptibility to erosion is reflected in the catchment of the Congresbury Yeo which falls within the North Somerset Moors Priority Catchment. Here bare and / or compacted soils created by intensive dairying, outdoor pig rearing, poultry and maize production, suffer from soil erosion leading to the sedimentation of watercourses.[19]	Regional	The permanent pasture across much of the landscape reduces the risk of soil erosion, although inappropriate stocking may cause compaction and result in increased overland water flow and subsequent increased erosion. Woodlands, dense hedgerows and permanent grassland or buffer strips across slopes and alongside watercourses can reduce the velocity of water as it flows across farmland, potentially reducing soil erosion and safeguarding soil quality. Appropriate fencing to prevent livestock trampling the riverbanks, and appropriate stocking levels to prevent poaching and capping could improve soil quality. These measures are recognised in the North Somerset Moors Catchment priority statement[14] which supports measures which minimise soil-wash entering watercourses, prevent pathways for run-off, and protect receiver watercourses.	Work with landowners to produce sustainable systems of arable cultivation and well managed livestock to reduce poaching and soil exposure, particularly on steeper slopes using measures such as expanding areas of permanent grassland, woodland, dense hedgerows and buffer strips across steeper slopes and next to watercourses. Plant or restore hedges, in keeping with landscape character to impede cross-land water flow particularly during heavy rain. Furthermore maintain and create areas of semi-natural habitat and permanent grasslands to minimise soil compaction to improve water retention and reduce soil run-off across the NCA. Encourage landowners to make use of the Catchment Sensitive Farming capital payments for the North Somerset Moors priority catchment.	**Regulating soil erosion** **Regulating soil quality** **Regulating water flow** **Regulating water quality** **Biodiversity**

[19] Defra catchment priorities identified under the England Catchment Sensitive Farming Delivery Initiative (URL: www.defra.gov.uk/foodfarm/landmanage/water/csf/documents/catchment-priorities.pdf)

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Pollination	Woodlands Species-rich grasslands Species-rich road verges Gardens Traditional orchards	The woodlands/ orchards of the NCA and small remaining areas of flood plain grazing marsh, grasslands, road verges and remnant meadows will provide a nectar source for pollinating insects. Potentially the most important nectar source will be the very large numbers of domestic gardens which offer a rich foraging environment for pollinating insects. These lie relatively close to areas under agricultural production and provide both nectar and habitats for many insects.	Local	A strong pollinator population supports production of a wider variety of food products and supports food production in the future. Although there is a reasonable spread of flower-rich semi -natural habitat across the NCA, some of which are SSSI, there is scope to improve the condition of this habitat through appropriate management and to extend it where possible, including through environmental stewardship. Species-rich road verges provide a pollination network, linking pollinators to crops across the agricultural landscape. Less frequent cutting of road verges has helped improve their biodiversity value.	Improve the condition of and increase the area of semi-natural habitats, with particular emphasis on unimproved flower-rich grasslands, flood plain grazing marsh and traditional orchard. Encourage the use of nectar and forage mixes in arable land, and appropriate management of species-rich hedgerows, to increase the availability of nectar sources in close proximity to food crops requiring pollination. Work with, local authorities/ parishes to create multi-functional green spaces incorporating sympathetic management for pollination including appropriate management of road verges into cutting regimes, adding to the network of nectar sources close to pollinated food crops. Encourage nectar-rich planting in gardens.	**Pollination** **Food provision** **Biodiversity** **Sense of place/ inspiration**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Pest regulation	Existing semi-natural habitat Agricultural field margins Species-rich hedgerows Woodland	The mixed farming nature of the area, with a spread of semi-natural habitats throughout the agricultural area of this NCA will support species that will aid pest regulation.	Local	Increasing diversity in species and structure of field margins will increase the ability for these areas to support populations of pest regulating species such as invertebrates, birds and mammals. There is scope to improve the condition of, and extend the amount of semi-natural habitat across the area. Linking semi-natural habitat to provide a sustainable functional network will help support sustainable populations of pest regulating species and enable them to move around the landscape.	Maintain and expand the area of semi-natural habitats, throughout the NCA to provide a range of niches to support pest regulating species including invertebrates, birds and mammals. In addition, through mechanisms such as agri-environment schemes, encourage the use of field margins, beetle banks and headlands in arable land, to encourage pest regulating species in close proximity to food crop.	**Pest regulation** **Pollination** **Biodiversity** **Food production**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating coastal flooding and erosion	Rocky shoreline	This NCA has a short coast line, from Portishead to Clevedon, which is characterised by cliffs fronted by a rock platform, forming a narrow intertidal area, covered by intermittent mud and gravel deposits. This coastline has several conservation designations of international, national and local importance. In particular, it is part of the Severn Estuary SAC. The cliffed coast is largely undefended (although some local protection is in place), and the cliffs have a hard rock geology which is resistant to erosion and, as a consequence, erosion rates are generally low although there is local variation reflecting local geological and geomorphological factors.	Local	Coastal flooding and erosion do not significantly impact this NCA due to the rocky nature of the shoreline. The current coastal management policy is to hold the existing defence line around Clevedon with no active intervention along the rocky shore to Portishead. The Gordano valley is the most likely area to experience flooding. Climate change is likely to increase tidal flood risk in the Severn Estuary,[20] the tidal reaches of the Avon are at risk from tide locking.	Manage the coast in line with the existing policies to hold the existing defences as necessary, with no active intervention elsewhere. No additional opportunities exist due to the nature of the very short stretch of coastline attached to this NCA.	**Regulating coastal flooding and erosion**

[20] Severn Estuary Catchment Shoreline Management Plan, Environment Agency (URL: www.severnestuary.net/secg/docs/public per cent20consultation/ Sept10/12_Appendix per cent20I per cent20PART per cent20A_SEA.pdf)

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of place/ inspiration	Alternating ridges and broad valleys Avon Gorge Country houses and associated parkland Views outwards to the Cotswolds and Mendips Maritime port and city harbourside	Sense of place is provided by the varied topography of alternating ridges and broad valleys, and views outwards to the Cotswold and Mendip Hills, with the Avon Valley running across the centre of the NCA and the City of Bristol (with its dramatic gorge and Grade I-listed Clifton Suspension Bridge) lying at its heart and dominating much of the area. In former mining villages, settlement is often dispersed with rows of cottages and isolated houses, with scattered farmsteads and hamlets elsewhere, while the use of local stone, including a variety of limestone, Lias and Pennant Sandstone, influences character at a local level. Large country houses are common, their wooded parkland providing relief from the open, rolling farmland, while the Chew Valley Lake and Blagdon Lake reservoirs are distinctive elements of the rural Yeo and Chew Valley landscapes to the south. At the far south the Victorian seaside resort of Clevedon with its grand houses and pier are evidence of an past age of prosperity and rapid industrialisation. Mill buildings add further character to rural areas, while the traditional industrial associations of Bristol, based on its port, are an evident characteristic. **Continued over...**	Regional	The NCA is of variable character contrasting the relative tranquillity of the rural clay vales with the busy city, suburban commuter towns and arterial road routes. Continuing piecemeal development, not necessarily in character with the vernacular of the area, threatens the character of some of the more rural villages, particularly in the Chew Valley. Development along the M5 corridor particularly at Cribbs Causeway and development at Bradley Stoke and Emersons Green has resulted in the loss of large areas of farmland changing the character of the area and having causal effects on biodiversity and ecosystem services such as water availability, flood resilience, green space for recreation and well being.	There are opportunities through forward planning (coordinated across all 4 unitary authorities) to protect the rural character of the area from encroaching urban or suburbanisation. Maintain the rural settlement pattern of small villages clustered around springheads or along the springline in limestone areas, linear mining villages or scattered vale villages, linked by a complex network of lanes, using local stone to retain settlement distinctiveness according to the variability of the underlying geology across the NCA. Maintain, restore and manage for biodiversity and recreation, the historic parklands with their veteran trees and landscape design that are all key features of the landscape of this NCA. Maintain, restore and expand the semi-natural habitats of native woodland and species-rich grasslands that are intrinsic to the rural character of this area. Protect the impressive views of the Avon Gorge and its setting, the Clifton Downs, from encroachment and development. **Continued over...**	**Sense of place/ inspiration** **Recreation** **Geodiversity** **Biodiversity** **Regulating water quality** **Regulating water flow**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of place/ inspiration continued		**Continued from previous...** Development along the M4 and M5 corridors has led to extensive built development to the north and west of Bristol, giving these landscapes a modern, transitional character. The area is dominated in its centre by the City of Bristol with its many historical and cultural associations such as its Cathedral, University, merchant's houses and squares and impressive views, not least the Avon Gorge, while elsewhere in the NCA inspiration is provided by parklands, ancient woodlands, historic features, ridge-top views and tranquil valley landscapes. Bristol and the surrounding area have associations with a number of historical literary figures such as Wordsworth and Coleridge. JK Rowling, author of the "Harry Potter" novels was born just outside Bristol at Chipping Sodbury.			**Continued from previous...** Conserve historic buildings associated with the development of Bristol as a port and the mills, warehouses and factories associated with colonial import processing.	

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of history	Long timeline of historic features visible across the landscape. Associations with Brunel Bristol as a maritime trading port	The history of the landscape is evident in extensive prehistoric remains, including the stone circles and long barrow at Stanton Drew, the Stoney Littleton or Fairy Toot long barrow at Butcombe, the Neolithic and bronze-age barrows on high ground to the west and south of the NCA, and the iron-age hill forts such as Cadbury Camp, as well as Roman influences (the port at Sea Mills and villas either side of the Avon Valley and on the fertile soils north of the Mendip Hills). The Saxon-era earthworks of the Wansdyke cut across the ridges south of Bristol while Bristol itself reflects its importance as a trading port from medieval times onward – once the premier port of England. Tips and pits that once proclaimed the coal mining past of the wider area are now largely covered up, though the area's railways, canals and settlement pattern still reflect its industrial heritage. Aspects of history likely to be particularly evident to the general public include the area's prominent industrial/built features, notably strong associations with Brunel, including the Clifton Suspension Bridge, Bristol's Floating Harbour and the SS Great Britain permanently berthed in the Harbour, and Bristol Temple Meads Station and its strong associations with the genesis of the Great Western Railway. **Continued over...**	National	The area contains a wide range of visible history across both the rural and urban landscape. The historical features of the city of Bristol are well interpreted and accessible, though there is scope to provide improved interpretation of these and more rural features to develop wider understanding and appreciation of the area's heritage. For example completion of the Wansdyke ditch long distance footpath would provide many opportunities for historical interpretation. There are a number of historic buildings and scheduled ancient monuments currently on the English Heritage risk register including, for example, several sections of the Wansdyke that are at risk from arable ploughing.[21]	The protection of heritage assets should be ensured at every opportunity. Increase protection of above and below ground archaeology, for example, medieval township field systems, ridge and furrow, parkland, standing stones, hill forts, industrial relics and ports for educational and recreational purposes. Work with land managers to protect ridge and furrow and below ground features through appropriate land cover such as permanent grassland. The restoration and conversion of vernacular buildings should be sympathetic, use local materials and preserve local distinctiveness. Opportunities to enhance the setting, interpretation and legibility of heritage assets should be identified and realised. There are opportunities to develop the rights of way network, create circular walks with interpretation and themed local events linked to the area's historic and industrial heritage of national importance, to aid understanding, enjoyment and a sense of well-being.	**Sense of history** **Sense of place/ inspiration** **Recreation** **Geodiversity**

[21] Heritage at Risk Register South West, English Heritage (2011; www.english-heritage.org.uk/publications/har-2011-registers/)

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of history		**Continued from previous...** The great Victorian warehouses of Bristol such as Wills tobacco stand as testament to the City's trading past, its associations with slavery and its long maritime history. There are also a wealth of large country houses and parklands which demonstrate the previous wealth of the city area.				
Tranquillity	Rural landscape Parks and gardens Green infrastructure	Tranquillity has declined fairly significantly in the past fifty years, with 'undisturbed' areas falling from 53 per cent in the 1960s to 21 per cent by 2007.1 Disturbance is most significant around Bristol and along the main arterial routes out of the City (M4, M5, A38, A37, A4), with the only real 'undisturbed' areas remaining in the Yeo and Chew Valleys in the south and the rural landscapes to the north of Yate. Bristol airport significantly impacts the tranquillity south of Bristol, and beyond the boundaries of the NCA. Nevertheless, in this highly populated NCA, a sense of tranquillity is likely to be much sought after and relative tranquillity will be found in areas of parkland and woodland, such as Ashton Court and Leigh Woods to the west of Bristol and in the many parks and squares of the City.	Local	Although there is significant disturbance to tranquillity over much of this NCA, the provision of comparatively tranquil spaces is extremely important to residents particularly of the main urban areas. Municipal parks and historic parklands can provide a break from the constant background noise of the urban environment. Green infrastructure planning can play an important part in providing a network of spaces that could be considered tranquil in comparison to busy urban areas.	Ensure that adequate green infrastructure provision is integral to all development planning in order to expand areas of relative tranquillity particularly within the urban environment. There are opportunities to retain the remaining sense of tranquillity on downland and parklands, undeveloped valleys, woodland and agricultural land by protecting them from inappropriate development.	**Sense of tranquillity** **Sense of place/ inspiration**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Recreation	2,161 km of public rights of way Cotswold Way National Trail and other long distance paths National Cycle Network and off-road cycling Historic parkland City of Bristol with maritime historic assets Access to water sports	Recreation is supported by The Forest of Avon Community Forest, the River Avon Trail, the Bristol to Bath Railway Walk, Monarch's Way and 1.9 km of the Cotswolds Way. Overall there is a 2,200km network of rights of way at a density of 2.56 km per km^2 and around 1,000 ha of open access land covering 1.12 per cent of the NCA, which is particularly important in this highly populated NCA. Ashton Court and Leigh Woods provide recreational opportunities to the west of Bristol, while in the east of the City there are walks along the River Frome to the Oldbury Court Estate. In the south of the area, the Chew Valley Lake and Blagdon Lake reservoirs offer opportunities for fishing, sailing, walking and bird-watching. The rock formations also provide opportunities for climbing and caving. The City of Bristol is a major tourist destination known for Brunel's masterpiece, the Clifton Suspension Bridge, its maritime history, and its harbourside. Bristol was the UK's first 'cycling city' and the National Cycle Network enables people to access the surrounding countryside and further afield with ease. The NCA enjoying a high density of National Cycle Network routes including Route 3 to Lands End and Route 4 London to Fishguard.	Regional	This NCA is assessable to the large populations of Bristol and Bath and the surrounding settlements. It is also easily accessible by road or rail to people much further afield. Tourism is important to the area and events such as the balloon festival draw in additional numbers of visitors. Outdoor recreation reconnects or maintains people's connection with the landscape and ecosystems that supports them and encourages a valuing of their surroundings. Opportunities for access to the countryside throughout the area are also valuable for health and wellbeing, particularly mental health in an area with such an urban concentration and provision of access is currently available through a network of green spaces and the rights of way network.	There are opportunities to improve access throughout the area through implementation of Rights of Way Improvement Plans, developing multi-user and "access for all" paths, clear signposting and improving interpretation to provide increased understanding and enjoyment for all. Ensure access balances recreational enjoyment, with the protection of biodiversity, geodiversity and historic features. Work in partnership with local heath boards to make the most of opportunities for heath and mental wellbeing through the rights of way network, connecting green spaces, parkland and downland. Manage the historic and other touristic assets which bring people to the area to ensure they are protected, while still being accessible to be enjoyed by the public.	**Recreation** **Sense of place/ inspiration** **Sense of history**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Biodiversity	Internationally designated sites Nationally designated SSSI Local Wildlife Sites and nature reserves	5 per cent of the NCA is covered by priority habitats (4,300 ha): 3,600 ha of this is priority woodland (lowland mixed deciduous and wet woodland) with 900 ha of reedbeds and 600 ha each of lowland meadows and coastal and flood plain grazing marsh, all BAP priority habitats. 2,000 ha of the NCA is designated as SSSI (2 per cent of the NCA area), there are 2 SPAs, 3 SAC and 1 Ramsar site and two National Nature Reserves, the Gordano Valley (part) and Leigh Woods. The majority of SSSI in the area are currently in favourable or recovering condition.	International / national	The area contains particularly important internationally designated ancient woodlands associated with the limestone ridge and Avon Gorge that support many rare and threaten species such as Bristol rock cress and the populations of unique whitebeam species. Protection, management and balancing the needs of the species with recreational pressures are crucial for the survival of these species. There are a variety of issues in the gorge which need careful management in order to protect areas of species-rich limestone grassland, rare plants as well promoting the growth of young whitebeams. Graffiti on the rock faces and possible impact of air pollution are also issues in the Avon Gorge. Graffiti removal is difficult as it may result in pollution issues and damage to sensitive rare plants and grassland habitats. Nitrogen deposition and nitrogen oxides from air pollution may be causing eutrophication of the Avon Gorge woodlands[22] and could potentially lead to the loss of sensitive species. Many of the SSSI across the NCA are designated for woodland or species-rich grassland. Appropriate land management will help to maintain and improve the condition of these sites in addition to benefiting a range of other ecosystem services.	Maintain and improve the condition of protected sites by working with landowners both of the sites and surrounding land, to protect sites and increase buffering and connectivity. Work with site owners including the National Trust and Network Rail to explore methods for sensitively managing graffiti on the rock faces of the gorge. Pollution from nitrogen deposition and nitrogen oxides are suspected to be having detrimental effects on the SAC. There is an opportunity to carry out air pollution monitoring to confirm whether this is the case and if so, inform action.	**Biodiversity** **Geodiversity** **Regulating water quality** **Regulating water flow** **Regulating soil erosion** **Recreation** **Sense of place/ inspiration**

[22] Appendix 5: Analysis of Air Quality, in: Habitats Regulations Assessment of the Draft Regional Spatial Strategy for the South West: Final Report, Prepared for the South West Regional Assembly by Land Use Consultants (February 2007)

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Geodiversity	Geological SSSI Local geological sites Accessible fossil beds Local stone used in building	There are 25 nationally designated geological SSSI in this NCA, plus two of mixed interest, reflecting the wide ranging geological interest and geological importance of this area. Many are man-made exposures from mining, quarrying or road/rail cuttings, but there are also natural features such as the Avon Gorge and coastal exposures. Fossil beds are prominent across the areas.	National	The geological SSSI provide important access to geodiversity, enabling the interpretation, understanding and continued research into the geodiversity of the NCA. Exposure of these features also makes a positive contribution toward sense of place and sense of history, both geological history and the industrial history of the area. Accessible fossil exposures are particularly good for instilling a sense of history in young children.	Maintain the largely good condition of geological SSSI in this area and work with landowners to improve the condition where required. Maintain views of geological features and exposures and where appropriate, improve access to cuttings, quarries and other exposures of geological features to enable improving understanding and enjoyment of geodiversity and sense of history. Promote the importance of this NCA in the history and development of geology and improve intellectual access and understanding of the geological features of the area. Work with partners to explore methods for sensitively managing graffiti on the rock faces of the gorge.	**Geodiversity** **Sense of place/ inspiration** **Sense of history**

Photo credits

Front cover: View across Chew Valley Lake from Burlage Hill. © Avon Wildlife Trust
Pages 4: © [redacted] Countryside Agency
Page 5, 7, 11, 12, 15, 30, 31 & 39: © [redacted] Natural England
Page 9 & 14: © Avon Wildlife Trust
Page: 13 & 16: © [redacted] Countryside Agency
Page: 15 & 21: © [redacted] Countryside Agency
Page 32: © [redacted] /Countryside Agency
Page 33: © English Heritage/ [redacted]
Pages 36 & 45: © [redacted] /Natural England

Natural England is here to secure a healthy natural environment for people to enjoy, where wildlife is protected and England's traditional landscapes are safeguarded for future generations.

Catalogue Code: NE400
ISBN 978-1-78367-139-7

Should an alternative format of this publication be required, please contact our enquiries line for more information: 0845 600 3078 or email enquiries@naturalengland.org.uk

www.naturalengland.org.uk

This note/report/publication is published by Natural England under the Open Government Licence - OGLv2.0 for public sector information. You are encouraged to use, and reuse, information subject to certain conditions.

For details of the licence visit www.naturalengland.org.uk/copyright

Natural England images are only available for non commercial purposes. If any other information such as maps or data cannot be used commercially this will be made clear within the note/report/publication.

© Natural England 2014



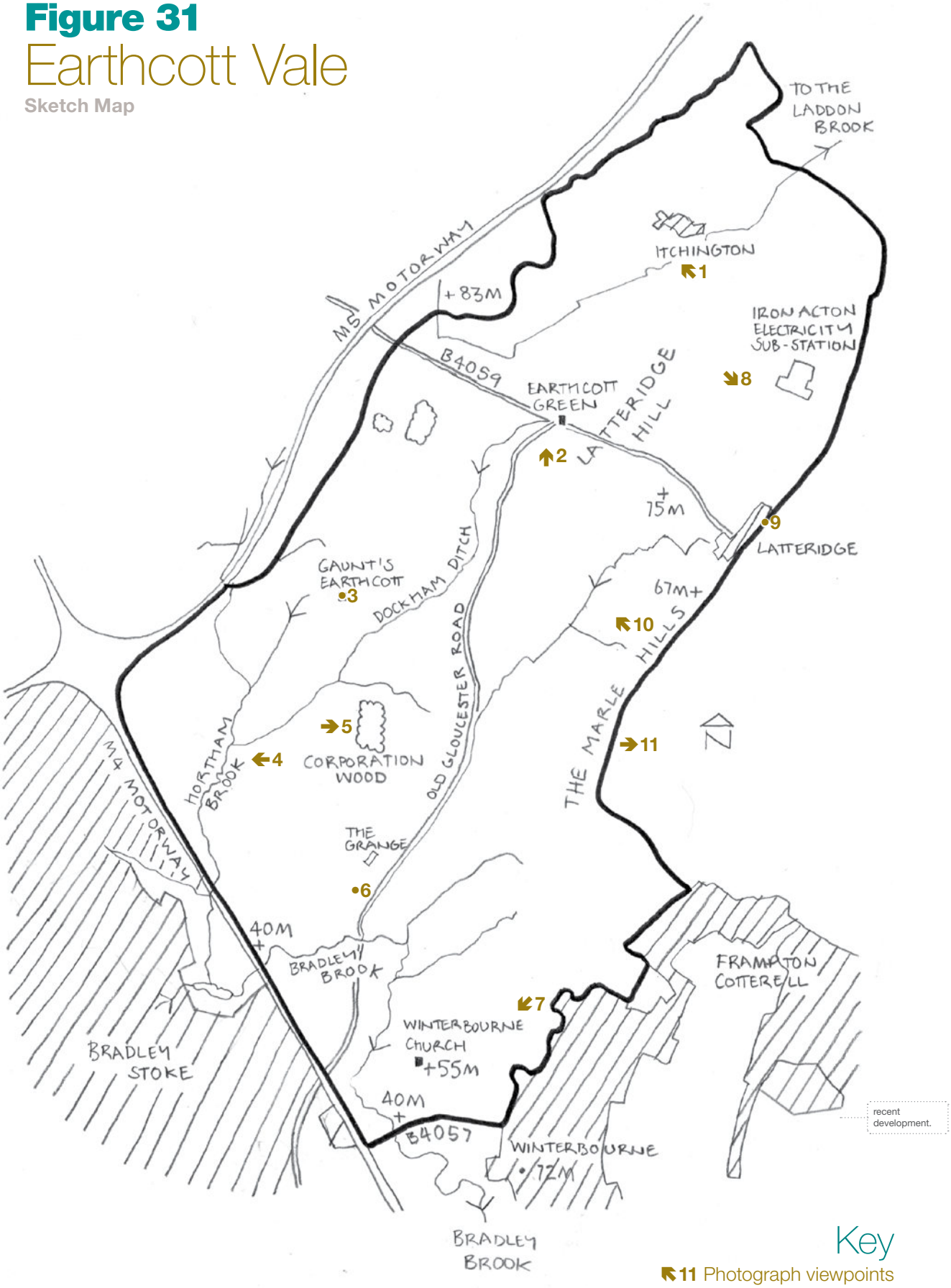
Area 10 Earthcott Vale



Contents

Sketch map	132
Key characteristics	133
Location	134
Physical influences	134
Land cover	135
Settlement and infrastructure	136
Landscape character	138
The changing landscape	141
Landscape strategy	144
Photographs	
Landscape character area boundary	

Figure 31
Earthcott Vale
Sketch Map



Key
11 Photograph viewpoints

Scale: not to scale

Area 10 Earthcott Vale



The Earthcott Vale landscape character area is a gently undulating agricultural area, divided by a complex network of hedgerows, trees and lanes.

Key Characteristics

- Gently undulating shallow vale with low ridges to the east at Latteridge Hill, The Marle Hills and Winterbourne, with small scale valleys to the south and small plateau area to the south west.
- Land cover of medium to small sized regular or irregular shaped pasture and arable fields, with some enlarged fields to the west.
- Several areas of calcareous and neutral grassland at Common Alm / Gypsies Platt provide attractive features in the landscape and support a diverse range of flora including areas of species-rich grassland, while the arable land provides nesting opportunities and winter foraging for a variety of farmland birds including Amber and Red Listed species.
- Fields are bordered by hedgerows that provide connectivity of habitat, varying from thick, clipped to overgrown or intermittent in places, with dense riparian vegetation in the south.
- The area is dissected by a number of watercourses with associated bankside vegetation that provide habitat and wildlife corridors for a range of species.
- Pennant sandstone walls define some fields and lanes near Winterbourne and Frampton Cotterell, with more limited limestone or Pennant sandstone walls associated with properties and settlement elsewhere.
- Broadleaf woodland is relatively limited with a few areas scattered around the west, including one with standing water. Mature hedgerow trees are frequent in the north and west and variable elsewhere.
- Settlement is limited, with traditional scattered farms, houses & hamlets, largely built of limestone in the west and Pennant sandstone in the east, associated with the narrow minor roads/lanes, which cross and intersect the area.
- Winterbourne Church and Court form a local landmark and North Woods Park has a local influence within a small valley, both to the south of the area.
- Winterbourne and Frampton Cotterell settlement edges define sections of the area's boundary. Bradley Stoke and the Bristol urban edge beyond the character area have some visual influence over the south western landscape.

Key Characteristics

- The south west has a concentration of recreational land use comprising a golf course, water sports, rugby ground and horse paddocks.
- Traffic on the M4 motorway and associated infrastructure has a local effect in this area.
- Land raising operations adjacent to the M4/M5 interchange and along the M4 corridor have formed significant man-made landforms, some with artificial profiles covered by rough grassland or scrub.
- Numerous powerlines and associated pylons cross the area and are visible horizontal and vertical elements. They converge on the Iron Acton sub-station to the north east.
- This character area includes the site of South Gloucestershire's first consented wind farm, proposed to comprise three 100m tall turbines to be located to the northeast of Earthcott Green and west of the Iron Acton Substation.

Location

The Earthcott Vale landscape character area is located in central South Gloucestershire, to the north east of Bristol.

The south west boundary is strongly defined by the M4, with the urban edge of Bristol beyond.

The north west boundary marks a transitional area, with a subtle change in landform and vegetation cover between the shallow vale of this area and the gently rising Rudgeway and Tytherington Ridge to the west.

The north and north east boundary also marks a transition between the more sloping ground and frequent tree cover of this area, compared with the more open and flatter Tytherington Plain beyond.

The eastern boundary marks a subtle transition between this sloping vale and the adjacent Yate Vale, following The Marle Hills and then the settlement edges of Frampton Cotterell and Winterbourne to the south east. (See Figures 25 & 40).

Physical Influences

The Earthcott Vale has varied geology, divided and orientated approximately along the line of the B4427, Old Gloucester Road, comprising White and Blue Lias limestone (largely at 60m a.o.d.) overlain by shallow Argillic Brown Earth soils to the west and Keuper marl (largely at 50m a.o.d. but rising to 67m a.o.d. at The Marle Hills) and overlain by clay / loam soils to the east.

Amongst this, there is a more complex pattern of clays around Earthcott Green and Latteridge Hill (at up to 75m a.o.d.), which continue south westwards in linear bands. On the south eastern boundary at Winterbourne, Pennant sandstone partly extends into this area (at up to 65m a.o.d.), whilst on the north western boundary to the north of Itchington, Carboniferous limestone underlies rising ground (continuing beyond this area to 97m a.o.d.).

This geology and resultant drainage pattern produces a gently undulating landform, with relatively higher ground centrally, in the area of Earthcott Green and Latteridge Hill, falling both north eastwards towards the Tytherington Plain and south westwards towards Bradley Stoke, both areas lying at about 50m a.o.d. on the boundary of this area.

The higher ground is dissected by shallow valleys and tributaries of the Dockham Ditch, Hortham Brook and Bradley Brook, which flow south west before joining the south eastwards flowing Bradley Brook beyond this area. In the north of the area, tributaries of the Ladden Brook flow north eastwards.

The valleys become more narrow and enclosed to the south, with tightly meandering natural channels. To the north, watercourses generally follow regular drainage ditches.

The landform, although subtle, is most evident centrally and to the east, with low south west - north east ridges formed at Latteridge Hill, The Marle Hills and Winterbourne, above lower lying valleys. Towards and beyond the western boundary the landform rises gradually, also in a south west – north east alignment, up to the Rudgeway and Tytherington Ridge.

In the south west of the area a small plateau, south of Gaunt's Earthcott lies at 60 metres a.o.d., with land to the south east beyond Bradley Brook, rising towards the Winterbourne ridge.

Land Cover

The area generally consists of pasture and arable land defined within a variety of field patterns. Field boundaries are commonly dense, clipped hedges, with overgrown thick hedges or intermittent laid hedges in places. The following variations are evident.

To the west of the B4427, Old Gloucester Road and north of Gaunt's Earthcott are medium sized regular fields, largely contained by clipped hedgerows, some intermittent, with mature hedgerow trees over the plateau, more infrequent to the west and north. Occasional hedgerow removal has formed some large fields and left isolated trees.

The area east of the B4427, south of Earthcott Green and rising to The Marle Hills, has a pattern of medium to small sized irregular fields, contained by clipped hedgerows and few hedgerow trees (Photo 10).

In the south, adjacent to the well vegetated Bradley Brook and its tributaries, the irregular field pattern is contained by tall and overgrown hedgerows. Similarly, dense, tall vegetation cover of varying structure follows the course of the Hortham Brook to the south west (Photo 4).

The remaining area contains small, more irregular fields. To the north and east, these are defined largely by clipped hedgerows and frequent hedgerow trees, with a more varied mix of clipped and occasionally overgrown hedgerows with trees, adjacent to Winterbourne and Frampton Cotterell.

A number of horse paddocks occur predominately within the south of the area, along lanes adjacent to the scattered settlement pattern and near the edge of Frampton Cotterell and Winterbourne. Timber fences have typically replaced the hedgerow boundaries.

Mature hedgerow trees of predominately oak and ash are frequent and dispersed throughout the north east and west; generally near settlement within the area as a whole, but are more infrequent in the south east. South west of Earthcott Green there are occasional copses and areas of deciduous woodland, Corporation Wood being the largest (Photo 5).

Woodlands Cemetery to the north of Earthcott Green comprises extensive memorial grounds of mown lawns, with tree cover and ornamental hedgerows, surrounded by agricultural fields.

Pennant sandstone and limestone walls are a common boundary treatment associated with rural properties and settlements, although generally not typical as field boundaries. Pennant sandstone walls are however common around the edge of Winterbourne and Frampton Cotterell and adjacent to country lanes. There are also examples of sunken lanes with hedge banks to the south.

A distinct area of parkland is evident at North Woods, around the Grange in the south, comprising mature tree specimens in grassland (Photo 6).

Formal recreational facilities lie to the south west and include Woodlands Golf Course to the east of the M4/M5 junction, comprising large scale earth mounding along the site's western and southern boundaries and an infrastructure of fairways, greens and tree planting, which retains some sections of the former mature hedgerow pattern; Almondsbury Windsurfing Lake, comprising an ad hoc development of buildings and earthworks around a quarried lake; and a rugby football club, comprising pitches, tall floodlights and buildings.

Land raising operations have also occurred along the south western boundary of this character area, both adjacent to the M4, with infilling of a field next to the Hortham Brook and, large scale earth mounding and tree planting parallel to the M4, south of Green Acres F arm.

Within the western fringes of Frampton Cotterell a large playing field, adjacent to the B4058, physically separates the settlements of Frampton Cotterell and Winterbourne. It is contained on two sides by housing and on the third by school grounds.

Biodiversity

Earthcott Vale comprises a mosaic of grassland, woodland and farmland with a criss-crossing of watercourses and ponds connected by wildlife corridors including hedgerows. This makes the Earthcott Vale an important habitat for a diverse range of species.

The landscape includes scattered woodland and copses, mainly in the south of the area approximately 7ha of which is ancient woodland.

There are several SNCIs within this character area, comprising a mosaic of habitats including grassland (both neutral and calcareous), broadleaved woodland (including ancient woodland) and flowing open water recognising the importance of these habitats within the national context for flora and fauna. Key species likely to be associated with the broadleaved woodland include bats and dormice both of which are present across the District and are UK priority species with associated Biodiversity Action Plans (BAP).

An area of calcareous and neutral grassland is designated as a SNCI, providing a diverse habitat that supports a range of invertebrates and includes ant hills as a regular feature. These invertebrates in turn provide a food source for mammals including bats.

The Bradley Brook SNCI is designated for its flowing water and bankside vegetation, and along with the other watercourses will support a diverse range of species from aquatic macro-invertebrates to fish and water voles. In addition, ponds and pools within the area will support amphibians such as great crested newts (a European Protected Species).

Much of the land use within this area is arable farmland, providing habitat for many species of ground nesting farmland birds including birds which have been listed as being Globally Threatened Red listed species, while the winter stubble provides a foraging resource.

There is a golf course within the Earthcott Vale, which may have the potential to provide a mosaic of habitats that can be utilised by a diverse range of species.

Settlement and Infrastructure

Settlement largely consists of small nucleated hamlets such as Itchington, Earthcott Green, Gaunt's Earthcott and Latteridge, which are generally located at key road junctions and crossroads. The rest of the area is scattered with isolated houses and farms (Photo 1, 2 & 3).

Winterbourne Court, Church and Tythe Barn complex to the south are important historically, as well as being a prominent local landscape feature, situated on the slopes of Bradley Brook valley (Photo 7), separate from the main settlement of Winterbourne. They are built of Pennant sandstone, which locally has a red-brown colour.

The Grange and Grange Court Farm are set within North Woods Park, on the upper slopes of a small tributary valley of the Bradley Brook. The estate architecture comprises the formal arrangement of large stone buildings of The Grange (a former asylum) to the north and a large house and farm complex at Grange Court Farm, to the south. Both have driveways across open lawns, with gatehouses adjacent to the Old Gloucester Road. The use of stone in the construction of older properties and boundary walls is typical, with the type of stone reflecting the local geological variation. Typically, Blue Lias limestone is used within the south west and Pennant sandstone in the south east and elsewhere.

Stone farm buildings largely form the hamlets of Gaunt's Earthcott, Earthcott Green, and Latteridge. Farm ponds are quite common around these hamlets, with a roadside pond forming a feature in Latteridge (Photo 9).

Adjacent to the M4 motorway, along the B4427 a small travellers' site, is enclosed by tall timber fences.

To the south east, the settlement edges of Winterbourne and Frampton Cotterell form the boundary to this landscape character area. Situated on the slightly higher ground of a broad ridgeline, the settlement edge is mainly formed by traditional houses, cottages and farm buildings, built of Pennant sandstone, clustered at road junctions between the B4058 and country lanes which extend into this area. Short sections of traditional linear development also spread along the B4058, interspersed by long lengths of stone walls and hedgerows. A more recent pattern of predominantly brick houses lines a short section of the B4058 and B4057, near their intersection, in the south.

The road network consists of a number of minor roads and lanes which criss-cross the area and each other at regular intervals. These routes include the B4427, Old Gloucester Road (a former turnpike road between Bristol and Gloucester), which crosses the area south to north, continuing beyond Earthcott Green as a lane; and the B4059 and B4057 which cross the area approximately in an east to west direction. The narrow country lanes, many with sharp bends, are often contained by hedge banks instead of hedgerows, with sections of stone walling nearer settlements.

The M4 defines the area's south western boundary. It passes variously within shallow cutting, low embankment or at grade. The M4/M5 interchange, with its associated multiple flyovers and earthworks, is located to the south west beyond large scale earth mounding. The interchange and a short section of the M5 define this edge of the character area.

There are numerous overhead powerlines and steel pylons crossing the area in all directions, converging on the large electricity sub-station to the north east. Mobile phone masts are also located along the south western boundary of this area, adjacent to the M4.

One recreational route within the series of Circular Rides in South Gloucestershire crosses the area in a small circuit, largely along lanes and ancient trackways. The route leaves Winterbourne, travelling along, Green Lane, Church Lane past Winterbourne Court, northwards along minor roads passing the Grange, along Tyning's Lane, Lock's Lane, over The Marle Hills and into the adjacent area.

There are also a number of public rights of way which criss-cross the area to the west of Winterbourne and north east of Earthcott Green. Elsewhere, the pattern is more irregular and dispersed, linking scattered farms.

Landscape Character

The Earthcott Vale landscape character area largely comprises a complex, gently undulating,

pastoral and arable landscape, with varying field pattern and landscape structure:

The northern area from Latteridge Hill, Earthcott Green to Itchington and the northern boundary, comprises a generally enclosed, small scale landscape of clipped and dense hedgerows, with frequent mature hedgerow trees within a gently rolling landform. Within this framework, the historic pattern of scattered farms, houses and the hamlets of Itchington, Earthcott Green and Latteridge, constructed from local Pennant sandstone, punctuate the area and are well integrated within the strong vegetation framework. Internal views are typically contained, with longer views possible along some road corridors, for example more elevated sections of the B4059 and from Latteridge Hill.

The limited and well integrated nature of settlement here, together with agricultural land use, visual enclosure formed by vegetation and a generally low lying landform, creates areas of tranquil and slightly remote character.

Woodlands Cemetery is located in a remote setting near Earthcott Green and is well integrated by hedgerow boundaries and the largely retained site hedgerows. The serpentine access road, new avenue tree planting, formal yew hedging and mown lawns, have introduced a more ornamental parkland structure, which is becoming more established with time. The reuse of farm buildings, largely intact hedgerow framework, low key use of the site and visual connection to the wider landscape, combines to ensure that the cemetery is becoming integrated with the surrounding rural character.

The Iron Acton electricity sub-station, located within this rural northern area, is generally well integrated as a result of the surrounding landscape framework, although the convergence of numerous powerlines and pylon towers are visually dominant locally (Photo 8). The powerline network is more evident within open views from higher ground in the adjacent character areas.

The elevated ridgeline of Rudgeway and Tytherington Ridge, beyond the north western boundary, forms a backdrop within occasional views from the western side of this character area (Photo 1). The M5, crossing the side slopes of this landform, is evident from within occasional glimpsed views from around Itchington, with some audible influence within this area.

From the northern boundary, the settlement edge of Tytherington, set on rising ground against a wooded ridge in the adjoining area, is well integrated with its church tower forming a distinctive landmark.

The area east of the B4427, south of Earthcott Green and rising to The Marle Hills, has a slightly more open landscape of medium to small sized arable and pasture fields, contained by clipped hedgerows and few hedgerow trees. The Marle Hills allow some distant views eastwards to the Cotswold Scarp (Photo 11) and westwards to the Rudgeway and Tytherington Ridge.

The plateau area to the west of the B4427 Old Gloucester Road and north of Gaunt's Earthcott has a semi-enclosed to open character, with medium sized fields, largely clipped hedgerows and frequent hedgerow trees, over a small plateau and a very gentle rolling landform. Hedgerow removal has created some large fields within this part of the character area, which in combination with fewer hedgerow trees to the west and north, has produced a more open character. Isolated, mature former hedgerow trees over the plateau form prominent features. Most of this area however, largely retains a strong landscape framework.

The few scattered areas of woodland within the west and south west are prominent features (particularly Corporation Wood, Photo 5), within views from the M5 and Rudgeway and Tytherington Ridge character area to the north west.

Scattered farms to the north of Gaunt's Earthcott are local features (Photo 3) that are generally well integrated within this low lying area, with its strong vegetation structure.

Within this localised area, the generally low lying landform, good vegetation structure and hedge banks along lanes, restrict and contain views, with the adjacent Rudgeway and Tytherington Ridge character area partly visible as a backdrop to the north west and the RAC tower (also outside the area) occasionally visible to the south west.

Within the south of the area, the small scale stream valleys form quite defined landform features compared with the broader rolling landscape elsewhere. Variations in land use and land cover have produced the following distinct areas:

- North Woods Park, with its parkland of mature trees and estate architecture of the Grange and Grange Court Farm, set elevated along a valley side, has a distinctive character and local visual influence along this small valley.

- Bradley Brook, Hortham Brook, Dockham Ditch and associated tributaries are lined by dense vegetation and trees, which visually emphasise their tightly meandering course. An area of overgrown hedgerows adjacent to the Bradley Brook, combine with the streamside vegetation, to produce a strong textured framework to the west and north of Winterbourne Church.

- To the east of the Bradley Brook, towards the edge of Winterbourne, rising ground is covered by open fields with a variety of field boundaries. Overgrown hedges with dead elm trees are occasionally prominent within local views. Clipped hedgerows and mature trees elsewhere, within a gently rolling landscape produce a simple, more open character (Photo 7).

- The open setting and position of Winterbourne Church and Court complex, above the Bradley Brook valley, form a striking local landmark. Pennant sandstone walls line the lanes and some fields, closer to the edge of Winterbourne (some in poor condition or overgrown) and permit some open views westwards.

The ongoing cycle of dead elm suckering is evident within a number of tall, overgrown hedgerows, generally in the south and near the edges of Frampton Cotterell and Winterbourne. These influence the condition, integrity and appearance of the landscape framework in the locality.

The formal recreation facilities in the south western corner of the area, variously influence local character:

The Almondsbury Windsurfing Lake and Rugby Football Club occupy a former quarry and agricultural fields, with overgrown hedgerow boundaries largely screening these areas and activities. Ad hoc buildings and earthworks adjacent to the regular shaped quarried lake and tall floodlight columns of the Rugby club, however, influence local views and character along Trench Lane.

Woodlands Golf Course and recent extension covers an extensive area and comprises an open to semi-enclosed landscape of mown fairways, new mound landform and linear tree planting (ornamental in places), visually contained to the south, west and north west by very large earth mounds. The existing course is partly visible from roads along its boundary and within middle distance views from higher ground beyond this area to the north west.

Within the Golf Course, the former agricultural field pattern has generally been restructured, with the loss or severance of some hedgerows, although isolated remnants of overgrown hedgerows and copses have been retained within parts of the golf course layout. Hortham Brook retains sections of its dense tree and scrub riparian vegetation.

Land raising, in association with the golf course and elsewhere, has had a significant impact on local landscape character:

- Existing earth mounding along the west and southern boundary of the golf course has produced a large scale, steep profiled landform, forming an artificial skyline and, covered by rough grassland, scrub, and developing tree cover, atypical of the surrounding landscape. This feature is highly prominent from the motorway interchange and its approaches. However, it is not particularly evident from within this character area, other than in local views and, it screens the M4/ M5 interchange and dense commercial development of Almondsbury Business Park within the adjacent area.

- Further earth mounding, associated with the extension of the golf course has been implemented, but the landforms remain visible along the north west boundary of the site.

- A field abutting the Hortham Brook where it passes beneath the M4 has been filled, forming a steep faced, unnatural landform with rough grassland cover.

- Further south at Green Acres Farm, an elongated mound parallel to the motorway forms a medium scale landform, with steep slope profiles, rough grassland and ~~new~~ tree planting. These are evident from the M4 corridor outside the area, but are less evident within the wider area, partially screening the M4 and its traffic. This mound also provides partial screening to a large industrial building beyond the area and M4 to the west.

The settlement edge of Winterbourne and Frampton Cotterell is set elevated above the Bradley Brook and its shallow tributary valleys, on the south eastern edge of this area. The northern settlement edge is largely well integrated, where the historic development pattern and materials of older buildings and forms relates and connects well to the adjacent agriculture field pattern of hedgerows (many overgrown) and frequent trees. To the south, the more regular linear pattern of houses along the B4058 and B4057 are more evident within local views, due to the limited boundary vegetation, fewer trees and therefore more open setting.

Middle to long distant views are possible from a number of elevated locations within this southern area:

- From the slightly higher ground above the Bradley Brook valley, south eastwards across the shallow vale, to Winterbourne and beyond. Frequent low undulating ridges, crowned by hedgerows and trees, the prominent middle distant ridgeline on which Winterbourne is located and the far distant Cotswold Scarp, form distinct layers within the landscape.

- The M4 provides a number of middle distant views between earth mounds, into the low valleys of this character area and across the undulating landform to higher ground at Winterbourne. This typically occurs where the M4 passes on embankment above the natural landform, with limited roadside vegetation.

The southern boundaries of this character area are contained by significant concentrations of settlement, with one boundary defined by the M4 corridor. These built elements variously influence landscape character:

Beyond the south west boundary and the M4 corridor, the variety and density of housing along the eastern fringes of Stoke Gifford and Bradley Stoke, together with adjacent commercial/ industrial development (some of which is on the skyline), in places creates an abrupt urban edge, with very limited vegetation or landform to provide integration with the adjacent landscape of this character area.

In open views from near the edge of Winterbourne, the eastern urban edge of Stoke Gifford is prominent and in stark contrast to the adjacent agricultural land use and the wider rural landscape of the Bradley Brook valley.

However, generally the visual impact of this urban edge is limited to the southern part of the character area, due to landform and intervening hedgerow and tree structure. In addition to the edge of Winterbourne, it influences the rural landscape immediately adjacent to the M4 corridor and country lanes as they approach this boundary.

Although the M4 itself is largely concealed either in cutting, by planting or by recent earth mounding at Green Acres Farm, large gantries and signage, tall light columns, traffic noise and mobile phone masts along this corridor have a wider influence within the south of the area.

There are a range of smaller scale, localised influences upon landscape character associated with land use and land use pressures within this area. These cumulatively can have a significant effect on landscape character:

- Horse paddocks, scattered within the south of the area and near Winterbourne, have in places disrupted the vegetation framework through changes in the management regimes of hedgerows and/or the replacement of hedgerows with timber fences. The consequence has been the creation of a more open landscape character than adjacent fields. This more open landscape increases the visibility of white tape electric fences subdividing fields, stables, parked vehicles, open storage, jumps and other features associated with the keeping of horses.

- The increased traffic volumes along some of the minor roads have, in places, caused the erosion of banks, verges and damage to walls, with traffic having an audible local effect.

- The travellers' site adjacent to the south western boundary is a small area off the B4427. The tall timber screen fence and dense cluster of caravans, contrasts greatly with the adjacent open rural setting. There is little vegetation either within or on the boundaries of the site to provide integration within the immediate locality and fly tipping in the vicinity leads to an erosion of landscape character.

The Changing Landscape

The Earthcott Vale landscape character area is a rural agricultural landscape with limited dispersed settlement, but which is subject to a range of significant pressures and changes that affect the landscape character and biodiversity value. In the south, parts of the area are influenced by recreational land use, the settlement edges of Winterbourne and Frampton Cotterell, the M4 corridor and proximity of Bradley Stoke, beyond this area.

The existing landscape framework of hedgerow and tree structure throughout the landscape character area is generally intact and in a relatively good condition. However, the following variations are evident:

- Some of the fields over the plateau to the west of the B4427 Old Gloucester Road and area north of Gaunt's Earthcott, have been enlarged through hedgerow removal, resulting in some intermittent hedgerows with consequent erosion of landscape character and loss of habitat value and connectivity.

- Within the small stream valleys to the south and areas closer to Winterbourne, hedgerows are not actively managed, resulting in the development of tall overgrown hedgerows to fields and dense shrubs and trees along watercourses.

- Within some of these overgrown hedgerows in the south and nearer to Winterbourne and Frampton Cotterell, sections of dead elm are apparent particularly in the summer.

The mature hedgerow tree and woodland structure throughout the area has few juvenile trees present to sustain the succession and therefore the framework in the long term. The decline of these features would significantly change the character and biodiversity value of the area.

Further removal of hedgerows would also result in a change of landscape character, creating a more open landscape than currently exists and loss of habitat and connectivity.

Whilst overgrown hedgerows provide structure and some degree of enclosure at present, in the longer term without management, the valley character may change as hedgerow species can eventually become over mature, allowing more open views beneath the canopies.

Similarly the present cyclical pattern of growth, decline and regeneration of elm suckers, already influences the degree of openness/enclosure within the landscape.

Ponds and pools are vulnerable to any loss of habitat including the terrestrial habitat around ponds as well as the ponds themselves.

Tree planting at Woodlands Cemetery, to the north east of Earthcott Green, is changing the character of the local area, increasing the strength of the landscape framework as the planting matures, in an area where tree cover was previously limited.

Restoration and enhancement works in other locations including at the Nature Reserve at Monks Pool and the restoration of Winterbourne Court Farm Barn have improved the fabric and settings of these heritage features, thereby contributing to the character, quality and distinctiveness of the surrounding landscape.

The recreational facilities in the south west of the character area have evolved within both a former agricultural landscape and one small former quarry site. These land uses are either contained by the original hedgerow pattern or, as in the case of the golf course, the agricultural pattern of hedgerows, trees and copses has been subsumed and often significantly changed.

This has produced an ornamental character within these sites which is different to the wider rural landscape.

In contrast large scale native planting has been implemented as part of the golf course expansion, to integrate the new landforms and land use pattern within wider views. A woodland structure will develop over time helping to provide screening and integration with the wider landscape as well as habitat value.

The hedgerows which presently contain these sites are largely overgrown, helping to screen these areas. However, without active management/ replanting, these hedgerows will decline in the long term, increasing the prominence of these recreational landscapes and their contrast with adjoining rural areas, primarily within local views.

The distinctive North Woods Park relies greatly upon its mature trees for its parkland character. Without replacement planting, the character of this parkland would decline in the long term.

The erosion of the landscape framework within the area as a whole, could raise the visual prominence of a number of built features which are currently well integrated. This would include the Iron Acton sub-station, pylons and powerlines to the north of the area, the settlement edge of Frampton Cotterell and Winterbourne to the south east, the limited scattered settlement pattern elsewhere and the Grange Solar Farm.

The network of narrow country lanes and roads are under pressure from traffic levels, due to the close proximity of and connection between Bristol, Winterbourne and Frampton Cotterell in the south. An increase in traffic volumes and/ or a perceived need for highway improvement measures, has the potential to introduce standard highway design solutions including kerbs, new signage and materials, which could have a localised, but cumulative, effect eroding the existing rural character. Physical damage is occurring to roadside walls, hedges and verges as a result of the traffic volumes using these routes.

Pennant sandstone wall boundaries near Winterbourne and Frampton Cotterell are in variable condition, being prone to damage from increased traffic along narrow lanes and deterioration due to limited maintenance of field boundaries elsewhere.

The sensitivity of the landscape to change varies considerably throughout the Earthcott Vale area, dependent on landform, the strength of the existing vegetation structure and the proximity and visual influence of settlement, the Bristol urban edge and built structures.

Given the strong vegetation structure and visual enclosure, the north and western areas are generally less sensitive to change. However, they are sensitive to the cumulative effect of change, for example built development, which has the potential to erode the generally tranquil nature within parts of this area.

The plateau area to the west of the B4427, Old Gloucester Road, north of Gaunt's Earthcott and east to The Marle Hills, is more open, but generally remains slightly remote, due to the relatively limited views obtained from within or over much of this area, and the very limited pattern of settlement, in the form of traditional farms and roads. The area is however sensitive to agricultural land use or management changes which might further erode the landscape framework, or to built development which might affect the pattern and integrity of the historic farm buildings.

The western boundary of this plateau area is visually influenced by the elevated Rudgeway and Tytherington Ridge to the west and is therefore, potentially sensitive to changes along the ridge which might affect the rural character of this area.

The rural landscape in the south forms an important buffer between Winterbourne/Frampton Cotterell and the M4 and the urban edge of Bristol beyond, due to the elevated aspect and views from settlement edges, motorway and other routes.

The partially eroded vegetation framework contributes to the degree of visibility. These areas are therefore vulnerable to any change, which might affect the rural character of the locality. The proposed significant scale residential development to the south of the M4 around Maules Farm will have a visual impact on this buffer and the edge of Winterbourne due to its elevated position.

There are significant development pressures on land adjacent to settlement edges and principal roads for potential housing infill, business, industrial, amenity use or other forms of land use change, such as horse paddocks or land raising operations.

The following types of development and land use change which have already taken place, illustrate the range of pressures and impacts within this area:

- Land raising has introduced new, unnatural landforms and poorer quality soils which, without adequate maintenance, result in weed encroachment and visually different grassland to adjacent agricultural land. Some areas planted with trees will, in the long term, result in woodland cover, which will help to reduce the impact of the landform and contribute to the vegetation structure and Forest of Avon objectives in the area.

- A number of mobile phone masts along the motorway corridor have introduced new skyline features, evident from adjacent rural areas and the M4. The proliferation of these masts is a recent development trend, introducing new structures to often rural, elevated and consequently visible locations.

- The formal recreational facilities to the south are largely well integrated, due to the existing vegetation structure, although the associated buildings, entrance/access roads and lighting infrastructure influence local landscape character, particularly along Trench Lane.

- Recreational pressure for 'horsiculture' is evident in the south of the area, particularly adjacent to Winterbourne. This change in land use is a relatively recent trend, which in places has led to the loss or erosion of hedgerows. The cumulative effect of this and the proliferation of associated infrastructure including subdivisions of fields by electric tape fencing, pressure on hedges from grazing, the construction of-stables, access tracks, exercise areas, jumps and floodlighting, can result in a marked change in landscape character. Lighting can also disturb wildlife.

- The travellers' site on the Old Gloucester Road is an isolated site. However, the tall timber fence boundary forms a locally prominent built feature, which does not relate well to its rural setting.

The effect of these changes on local character to the south west of the area, near the M4 corridor, are already apparent. However, further changes, or the effect of cumulative changes, which could influence the landscape structure of the area and character of the rural landscape could significantly affect the ability of this landscape to function as a physical and visual buffer between settlements, transport corridors and the Bristol urban edge.

The recently constructed solar park development at Grange Farm is not highly visible within the wider landscape but is partially visible through the hedge along Trench Lane. The accompanying landscape scheme should reinforce the existing vegetation structure and, in time, with help to absorb this development into the landscape.

Probably the most significant change in the landscape of the Earthcott Vale will however be the implementation of the consented scheme for 3 x 100m high wind turbines, plus associated substation and access track to the south of Earthcott Green. Cumulative impacts of adding further electricity lines should be avoided by the proposed underground cable connection. The turbines are proposed to be built in a location where the landscape character is significantly influenced by the presence of pylon lines linking to the nearby Iron Acton substation. Although at the time of writing, construction of the turbines had not commenced.

It is possible that works may be required to the electricity pylon network as a result of the proposals for a new nuclear power station at Oldbury B. While these have the potential to compound existing impacts, during either construction or operation, a rationalisation of the wirescape could be beneficial to the locality.

Landscape Strategy

- Succession planting of broadleaf woodland, parkland and hedgerow trees as well as at the settlement edges is necessary to sustain the differing characters of the character area into the future, and to maintain and enhance biodiversity value.

- To ensure the existing habitat resource is retained as a diverse mosaic of grasslands and woodlands with connectivity through wildlife corridors such as hedgerows.

- The subdivision of fields or replacement of hedges by fencing or electric tape should be resisted due to its erosion of landscape character and potential loss of habitat value and connectivity.

Landscape Strategy

- Retention and active management of hedgerows to help to ensure the conservation of these key landscape and biodiversity features for the long term across the entire character area. This is important across the character area, but particularly pressing in the south where the erosion of the landscape structure is extending the urbanising influence of adjacent settlement and the motorway into the Earthcott Vale area.

- Any new highway works should seek to protect and incorporate traditional landscape features or replace them where necessary, so that the rural character of the road network is retained.

- To encourage and support the repair and retention of natural stone walls and other traditional features such as historic stiles, pennant stone kerbing and traditional street lights.

- To maintain the open nature of the fields surrounding the hamlet at Church Lane, Winterbourne, together with the sharp distinction between the core residential area and the rural context.

- Any built development, horsekeep or structures in the northern and western parts of the character area should incorporate robust landscape proposals and careful consideration of form, massing, lighting, materials and colour to ensure that the tranquil nature of the locality is protected and enhanced, including consideration of the effects on views from elevated ground to the west.

- Robust planting schemes should be implemented as part of any development, including recreational schemes, along with long term management and maintenance plans in order to maximise the integration of these developments into the surrounding landscape, and to avoid erosion of the character and biodiversity value of the rural landscape.

- Respond to consultations on National Grid schemes to seek to secure rationalisation of the plethora of electricity and pylon lines in the locality and consequential reductions in impact on the Earthcott Vale landscape. Should changes to the substation be required, seek to secure robust landscape proposals to screen the infrastructure and reintegrate the facility into the landscape.

- Consideration should be given to the provision of off site planting to mitigate the impacts of any highly visible developments in this and the adjacent landscape areas, particularly those to the north and east.

- Protect higher grade farmland from development.

- Encourage small woodland and hedgerow tree planting through the Bradley Brook valley and the edge of Winterbourne to filter views of the M4 and urban edge.

- Maintain and improve tranquillity and landscape quality by controlling light pollution, screening visually intrusive elements, repairing and maintaining the landscape structure, removing fly tipping.



1 View towards Itchington, with narrow country lanes enclosed by hedgerows. The M5 motorway follows the skyline, with vehicles visible.



2 Looking north west from Kites Hill towards the hamlet of Earthcott Green. The Rudgeway and Tytherington Ridge forms the skyline.



3 Typical old Gloucestershire farmhouse architecture at Green Farm, Gaunts Earthcott. The window styles are a more recent addition.



4 Hortham Brook with open pasture and isolated trees. This area now forms part of Woodlands Golf Course.



5 Southern edge of Corporation Wood. Surrounded by deep ditches filled with water. Isolated woodland surrounded by fields.



6 Scots pine and groups of mature trees form parkland landscape within Grange Court Farm estate.



7 Winterbourne Parish Church lies outside the village amid a mosaic of fields and hedges in a gentle landform.



8 Pylon towers at Iron Acton electricity sub station.



9 Farm pond at Latterridge.

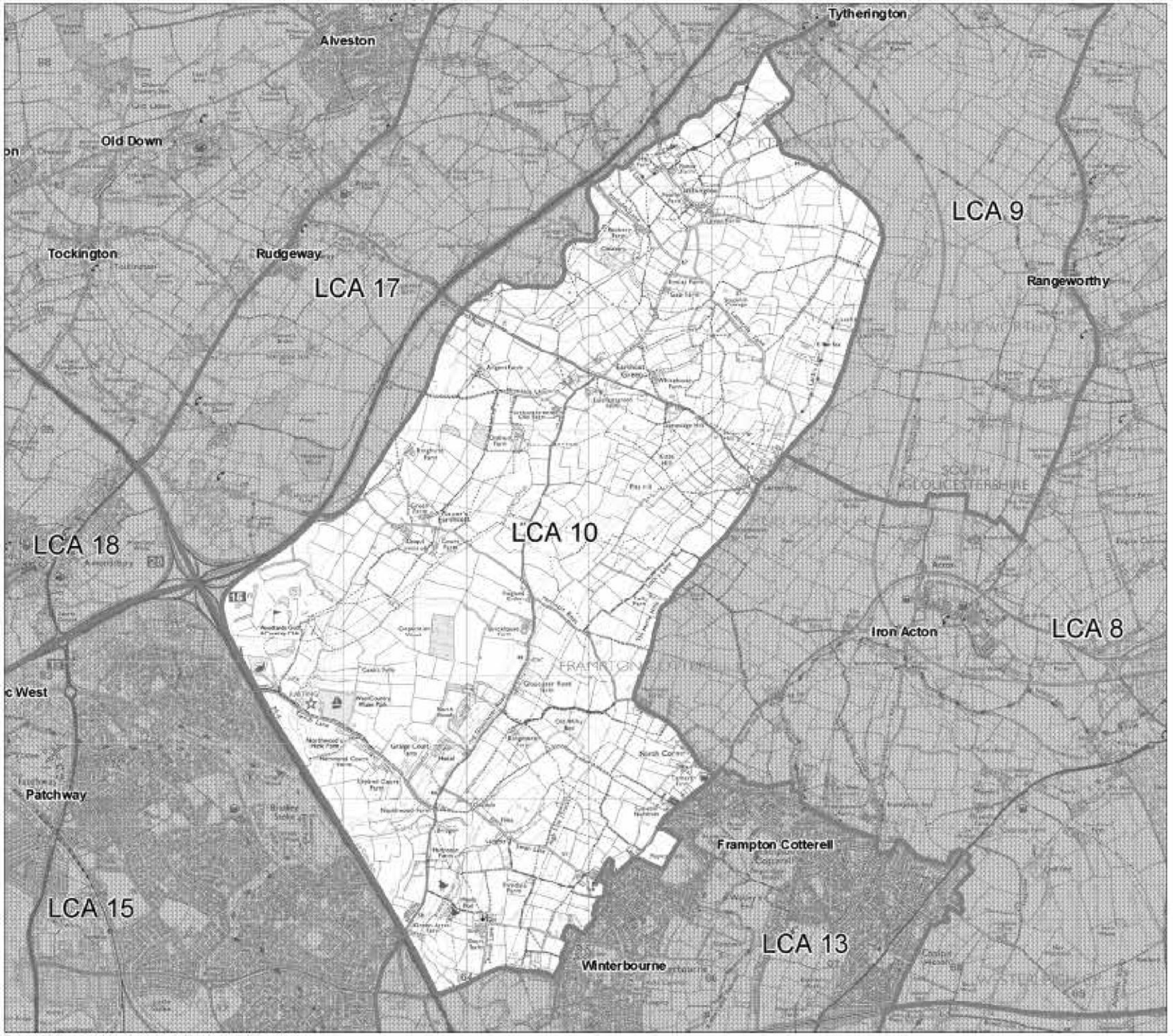


10 View from the Marle Hills north westwards. The middle distance shallow ridge continues to the right forming Pits Hill, Kites Hill and Latteridge Hill, with the wooded Rudgeway Ridge visible on the skyline.



11 View eastwards towards the Cotswolds from the Marle Hills, near Perrinpit Farm.

Figure 32 – Area 10
Earthcott Vale



Legend

South Gloucestershire Boundary

Landscape Character Area

The Landscape Character Area boundary shown on this map is indicative, sometimes marking a distinct change, but more often representing a transition in character with adjacent areas.

Similar attributes may therefore be evident within adjacent areas. (For further information refer to Report Section 4.1)

N

0 1km

Reproduced from the Ordnance Survey mapping with the permission of the Controller of Her Majesty's Stationery Office. Crown Copyright. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceedings.

South Gloucestershire Council Licence No 100023410, 2006

Figure 33
Area 10
Earthcott Vale

Stansted:
Unit 1, The Exchange,
9 Station Road, Stansted, CM24 8BE

t +44 (0)1279 647044
e office@lizlake.com
www.lizlake.com

Bristol:
1 Host Street,
Bristol, BS1 5BU

t +44 (0)117 927 1786

Nottingham:
Sutton Place, 49 Stoney St,
Nottingham NG1 1LX

t +44 (0)115 784 3566

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS

- Landscape Design
- Urban Design
- Residential
- Public Realm
- Masterplanning
- Landscape Planning
- Heritage Landscapes
- Gardens and Estates
- Restoration and Conversion
- Places of Worship
- Expert Witness
- Hospitality
- Education
- Retail / Office
- Community
- Ecology
- Arboriculture
- 3D / Graphic Design

Appendix D

WOODLANDS GARDEN VILLAGE, BRISTOL

STRATEGIC LANDSCAPE AND VISUAL ASSESSMENT

LIZ LAKE ASSOCIATES LANDSCAPE AND VISUAL APPRAISAL METHODOLOGY

December 2016

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS

METHODOLOGY FOR:

LANDSCAPE AND VISUAL APPRAISAL

Liz Lake Associates

December 2013

1 INTRODUCTION

1.1 Background

1.1.1 This document sets out the Methodology used by Liz Lake Associates, Chartered Landscape Architects, Urban Designers and Landscape Planners to prepare a Landscape and Visual Appraisal (an Appraisal). It is based on the *Guidelines for Landscape and Visual Impact Assessment, Third Edition 2013* (the Guidelines) published by the Landscape Institute/Institute of Environmental Management and Assessment.

1.2 Scope of a Landscape and Visual Appraisal

1.2.1 An Appraisal is undertaken to identify the landscape and visual issues of a potential development site (the Site) and to help inform the design process.

1.2.2 The data on the Landscape or Visual Baseline that describes the existing situation could be used for any form of development on the Site. The Proposals, the assessment of the effects of the Proposals, and the assessment of the ability of the Site to absorb change are specific to the development under consideration.

12.3 Photographs are taken on a digital camera with a fixed lens that approximates to a standard 50mm lens in accordance with the Landscape Institute Technical Advice Note 01/11.

1.2.4 The Guidelines emphasize that any Appraisal should be in proportion to the scale of the project that is being assessed and the nature of its likely effects. This Methodology sets out the range of potential activities for an Appraisal; for smaller projects principles will be followed but the scope of work may well be reduced.

2. THE EXISTING SITUATION: BASELINE DATA

2.1 Scope of work

2.1.1 The Guidelines (3.15) outline the scope of the baseline studies as follows:

- *'For the landscape baseline the aim is to provide an understanding of the landscape in the area that may be affected – its constituent elements, its character and the way this varies spatially, its geographic extent, its history (which may require its own specialist study), its condition, the way the landscape is experienced, and the value attached to it.*
- For the visual baseline the aim is to establish the area in which the development may be visible, the different groups of people who may experience views of the development, the places where they will be affected and the nature of the views and visual amenity at these points.' The effects of a proposed development on visual amenity are classified as effects on population.

2.2 Establishing the Landscape Baseline

2.2.1 The location of the Site is identified in published National Character Areas, Local Landscape Character Assessments, supplementary planning documents such as green infrastructure proposals, countryside strategies, and published mapping. An assessment of the Local Landscape Context is undertaken to identify how representative the locality of the Site is of the local landscape character type/area. Field work is undertaken in good weather conditions, by a Chartered Landscape Architect, from a car, bicycle or on foot.

2.3 The Value of the Landscape

2.3.1 Desk and field surveys are undertaken to establish the baseline conditions of the Site itself, the 'fabric' of the landscape. Features, elements, combinations of elements and less tangible attributes such as the aesthetic qualities of the Site are considered. These attributes are assessed against criteria that indicate the value of the landscape including landscape quality (condition), scenic quality, rarity, representativeness, conservation interests, recreation value, perceptual aspect including tranquillity, and cultural association. Other criteria include replaceable / substitutable, frequency and dominance of incongruous elements, importance placed on the Site by stakeholders, local accessibility to the Site and its role in wider pattern of accessibility and its importance at a local, national or international level.

2.4 Contribution to the Local Landscape Character

2.4.1 Having described and evaluated the attributes of the Site, some methodologies apply a high/ medium or low value to the landscape. It is considered that for smaller sites it is more useful to express value as the contribution that the Site makes to the local landscape character. The definitions for this evaluation are:

- ***Outstanding contribution:*** Where the existing character of the Site is representative of the local landscape character and the structure of the landscape is intact
- ***Very positive contribution:*** Where the existing character of the Site contains many attributes representative of the local landscape character and the structure of the landscape is apparent

- ***Positive contribution****:* Where the existing character of the Site contains some attributes representative of the local landscape character and some incongruous elements but the Site does not detract from the local landscape character
- ***Limited contribution****:* Where the existing character of the Site contains some attributes representative of the local landscape character but also incongruous elements that detract from the local landscape character
- ***Negative contribution****:* Where the existing character of the Site contains no attributes representative of the local landscape character and the incongruous elements detract from the local landscape character.

2.5 Establishing the Visual Baseline

2.5.1 If the Visual Baseline survey is made when vegetation is in leaf, an assessment is also made of the likely winter views. The survey is generally illustrated on a plan accompanied by a photographic record.

2.6 Identifying Viewpoints

2.6.1 The Visual Baseline is an evaluation of the existing visual amenity in the locality and the contribution that the Site makes to existing visual amenity. Specific evaluations from identified viewpoints are used for the assessment of visual effects. A *viewpoint* is a place from where there is a potential view of the Proposals and the *visibility* of the Proposals is the extent to which they may be seen from public viewpoints and private properties. Viewpoints fall broadly into three groups, representative viewpoints, specific viewpoints and illustrative viewpoints.

2.6.2 All public places and residential properties that might have a view of the Proposals are assessed. Eye level is taken as 1.5m to 1.7m above ground level for pedestrians and one metre above ground level for car occupants. Unless special circumstances prevail, access is not made to the interior of residential properties. The orientation of dwellings and surrounding vegetation that may influence views are noted.

2.6.3 If the Visual Baseline survey is made when vegetation is in leaf, an assessment is also made of the likely winter views. The survey is generally illustrated on a plan accompanied by a photographic record.

2.7 Visual Receptors

2.7.1 The location of people who may experience changes in views (visual receptors) is identified; the most susceptible/sensitive receptors are considered to be: residents at home; people, whether residents or visitors, who are engaged in outdoor recreation including public rights of way whose attention or interest is likely to be focused on the landscape and on particular views; visitors to heritage assets, or to other attractions, where views of the surroundings are an important contributor to the experience; communities where views contribute to the landscape setting enjoyed by residents in the area; travellers on recognised scenic routes and people at their place of work where views are an important contributor to the setting and to the quality of their working life.

2.7.2 Visual receptors moderately susceptible/sensitive to change are considered to be travellers on road, rail or other transport routes.

2.7.3 Visual receptors likely to be less susceptible/sensitive to change are considered to be: people engaged in outdoor sport or recreation which does not involve or depend on the appreciation of views of the landscape; people at their place of work whose attention may be focused on their work or activity, not on their surroundings, and where the setting is not important to the quality of working life.

2.8 Assessing the Existing Visual Amenity

2.8.1 The existing *visual amenity* from principal viewpoints is assessed using published surveys if they exist or using the professional judgement of an experienced landscape architect using the following definitions to define the value attached to particular views:

- ***Exceptional visual amenity*** – where the quality of existing views is such that people would travel some distance to experience them
- ***High visual amenity*** – where the quality of existing views is such that local people would go out of their way to experience them
- ***Good visual amenity*** – where the quality of existing views is such that there are few incongruous elements and the views are enjoyed by local people on a day to day basis
- ***Fair visual amenity*** – where the quality of existing views is such that there are a number of incongruous elements and local people are likely to be indifferent to the view
- ***Poor visual amenity*** – where the quality of existing views is such that the incongruous elements dominate and the view is not likely to be valued by local people.

3 ASSESSMENT OF LIKELY EFFECTS

3.1 The Proposals

3.1.1 The *Proposals* are the development envisaged for the Site and an Appraisal helps guide the design team as to the extent and form of the development and to create new landscapes that make a positive contribution to the local landscape character.

3.2 Identifying the Landscape Effects

3.2.1 The *effects* are the changes to the Site, quantitative or qualitative, compared with a scenario without the Proposals. Effects can be adverse or beneficial, direct, indirect or cumulative.

3.2.2 An assessment is made of the ability (the susceptibility) of the existing landscape to accommodate the specific proposed changes without undue negative consequences on the local landscape character. This is combined with the value of the landscape receptors identified in the Landscape Baseline to judge the sensitivity of the landscape receptors. The characteristics of the Proposals and the magnitude of change is identified and judged against the sensitivity of the landscape receptors; these factors all combine to assess the significance of the landscape effect. For an Appraisal the potential likely effects are identified but in the absence of detailed proposals significance is not determined.

3.3 Magnitude of Change

3.3.1 The description of the *magnitude* of change will include the likely *extent, scale* and *duration of:*

- Changes to the existing landscape fabric (eg the loss of trees and hedges or other landscape features)
- New elements introduced to the Site (built and natural)
- Changes to local perceptions of the Site.

3.4 Assessing Susceptibility for Landscape Effects

3.4.1 The following definitions are used to assess susceptibility, as there are always many variables, it is sometimes necessary to review these for specific development proposals. The core definitions which are reviewed for individual assessments are:

- ***High Susceptibility:*** A finely balanced landscape where the landscape character is so well defined that even a small-scale development might cause a significant loss of, key characteristics, individual elements or features and specific aesthetic or perceptual aspects or, overall landscape character
- ***Medium/High*****:** An established landscape with a well-defined character where only well-considered changes could be accommodated without loss of key characteristics, individual elements or features and specific aesthetic or perceptual aspects or, overall landscape character
- ***Medium Susceptibility:*** An established landscape where change of an appropriate nature could be absorbed without loss of key characteristics, individual elements or features and specific aesthetic or perceptual aspects or, overall landscape character
- ***Medium/Low Susceptibility:*** A damaged or robust landscape where appropriate change can be absorbed and could contribute to the restoration of key characteristics, individual elements or features and specific aesthetic or perceptual aspects or, overall local landscape character
- ***Low Susceptibility:*** A damaged landscape where change would bring opportunities for the significant enhancement of key characteristics, individual elements or features and specific aesthetic or perceptual aspects, the overall local landscape character or the creation of a new landscape.

3.5 Identifying the Visual Effects

3.5.1 The *visual effects* are the potential changes to the Site, quantitative or qualitative, compared with a scenario without the Proposals. Effects can be adverse or beneficial, direct, indirect or cumulative.

3.5.2 The likely nature of the view of the development is assessed at identified viewpoints, or groups of representative viewpoints; for example the elevation of the view; a full, partial or glimpsed view; the proportion of the development that would be visible; the distance of the viewpoint for the development; the scale and proximity of the view of the development; whether the view is stationary, transient or sequential; changes in the existing skyline profile, creation of a new visual focus in the view, introduction of new man-made objects, changes in visual simplicity or complexity, alteration of visual scale, and change to the degree of visual enclosure.

3.5.3 The likely potential of the visual effects of a Proposal is assessed against the susceptibility of the existing visual receptors (people who see the view) to changes in views and visual amenity as outlined above. For an Appraisal the potential likely effects are identified but in the absence of detailed proposals significance is not determined.

3.6 Providing a way forward

3.61.1 Using professional judgement, an Appraisal is undertaken at the early stages of a project to identify the landscape and visual issues of a potential development site and to help inform the design process. The results of the Appraisal are presented in a written report and/or plans. This could be a *Landscape Strategy, Mitigation Strategy* or an *Opportunities and Constraints* plan prepared to include measures designed to avoid, reduce, remedy, or compensate for potential landscape and visual effects either as mitigation or enhancement and may include proposals for the future landscape management of the Site.

7. THE METHODOLGY

7.1 The Methodology

7.1.2 This Methodology has been developed by Liz Lake Associates over a number of years. It has been revised regularly and the most recent revision was in November 2013. Experience shows that the Methodology has to be regularly reviewed as it is tested against individual projects and continuing developments in this field of work. Liz Lake Associates reserve the right to amend the Methodology as the technique becomes more established.

© Liz Lake Associates December 2013

Stansted:
Unit 1, The Exchange,
9 Station Road, Stansted, CM24 8BE

t +44 (0)1279 647044
e office@lizlake.com
www.lizlake.com

Bristol:
1 Host Street,
Bristol, BS1 5BU

t +44 (0)117 927 1786

Nottingham:
Sutton Place, 49 Stoney St,
Nottingham NG1 1LX

t +44 (0)115 784 3566

LIZ LAKE
ASSOCIATES
LANDSCAPE ARCHITECTS

- Landscape Design
- Urban Design
- Residential
- Public Realm
- Masterplanning
- Landscape Planning
- Heritage Landscapes
- Gardens and Estates
- Restoration and Conversion
- Places of Worship
- Expert Witness
- Hospitality
- Education
- Retail / Office
- Community
- Ecology
- Arboriculture
- 3D / Graphic Design

Woodlands Golf Club

Transport Study Addendum

Date: 08/01/2018

Introduction

1. This Technical Note has been prepared to assess the cumulative traffic impact of the Woodlands site taking into account the West of England (WoE) Joint Spatial Plan (JSP) draft allocation sites to the north of Bristol. This note supplements the Vectos Transport Study (VTS) prepared in August 2017 and should be considered in the context of the VTS, the Joint Spatial Plan (JSP) and the Joint Transport Study (JTS).

2. The modelling work contained within the VTS was prepared to compare the transport impact of the Woodlands and Buckover developments. This note has been prepared to consider the transport impact of the delivery of the Woodlands scheme over and above all draft allocations north of Bristol (See Table 1) in the event that it is decided that additional housing growth in the area is required and both sites are required to deliver this.

Committed Development

Sites

3. The draft JSP was published in December 2017 and is currently progressing through the formal consultation process. For the purpose of this assessment the following sites have been included within this assessment work. The developments as set out within Table represents the level of development to be delivered within the plan period as set out within the Draft JSP. With regards to the Buckover site, it is expected that this could deliver 3,000 dwellings in total with at least 1,500 delivered within the plan period. This assessment has assumed 2,000 dwellings at Buckover so that it is consistent with the VTS as Buckover was originally a draft allocation for circa 2,000 dwellings

Table 1: Draft JSP sites and Woodlands

		Buckover	Charfield	Coalpit Heath	Yate	Thornbury	Woodlands
Dwellings	Houses (within Plan Period)	2,000	1,200	1,800	1,000	500	2,000
FE	Primary School		1.5	2	1		1
	Secondary School						
HA	Employment		5	5	30	5	
	Local Centre			Y	Y	Y	Y

Trip Generation

4. A traffic generation forecast has been calculated for the above sites based on residential and education trip rates as per the VTS. Employment trip rates have been calculated through taking an average trip rate from the TRICS database for B1, B2 and B8 land uses. In order to convert employment area presented in hectares (HA) to SQM it is assumed that each HA provides 5,000 (GFA) of employment floorspace. The employment TRICS outputs are provided at **Appendix A**.

5. The traffic generation associated with the above schemes have been refined to take into account the internalisation of trips within these sites. The level of internalisation is as per the assumptions made with regards to the Woodlands and Buckover sites contained within the VTS. For clarity the following discounts are applied to the traffic generation figures:

   - Residential to / from Shops / Leisure: 20% discount;
   - Employment trips: 10% discount;
   - Primary Education trips: 80% discount.

6. Further discount has been applied to take into account personalised travel planning which ranges from site to site based on their level of accessibility and proximity to key destinations.

7. Details of the trip generation forecast are set out in Table 2 to 5 below and at **Appendix B**. The traffic generation associated with the Woodlands and Buckover sites are as per the VTS.

Table 2: Net External Traffic Generation Associated with Thornbury Draft Allocation*

	0800 to 0900			1700 to 1800		
	IN	OUT	TOT	IN	OUT	TOT
Resi and Edu	51	140	191	125	71	196
Employment	13	4	16	2	11	13
TOTAL	64	144	207	127	82	209

**Inclusive of internalisation and discount associated with Personalised Travel Planning (8%)*

Table 3: Net External Traffic Generation Associated with Yate Draft Allocation*

	0800 to 0900			1700 to 1800		
	IN	OUT	TOT	IN	OUT	TOT
Resi and Edu	65	256	320	247	132	379
Employment	77	21	98	12	66	78
TOTAL	141	277	419	259	198	457

**Inclusive of internalisation and discount associated with Personalised Travel Planning (8%)*

Table 4: Net External Traffic Generation Associated with Coalpit Heath Draft Allocation*

	0800 to 0900			1700 to 1800		
	IN	OUT	TOT	IN	OUT	TOT
Resi and Edu	118	440	558	426	239	665
Employment	12	3	16	2	11	12
TOTAL	131	443	574	428	249	677

**Inclusive of internalisation and discount associated with Personalised Travel Planning (12%)*

Table 5: Net External Traffic Generation Associated with Charfield Draft Allocation**

	0800 to 0900			1700 to 1800		
	IN	OUT	TOT	IN	OUT	TOT
Resi and Edu	82	334	417	326	176	502
Employment	77	21	98	12	66	78
TOTAL	159	356	515	338	242	580

**Inclusive of internalisation and discount associated with Personalised Travel Planning (8%)*
***Residential Trip rates increased by 10% to reflect unsustainable location*

Traffic Distribution

8. The distribution of the residential and education elements of the draft JSP schemes have been calculated as per the methodology used within the VTS. However, appropriate and representative Census Output Areas have been used for the sites respectively. This method is based on the residential population.

9. With regards to the distribution of employment trips a similar methodology to the above, and as per the VTS, has been used. However, the daytime population has been used.

10. Details of the distribution calculation is provided at **Appendix C**.

TEMPRO Growth

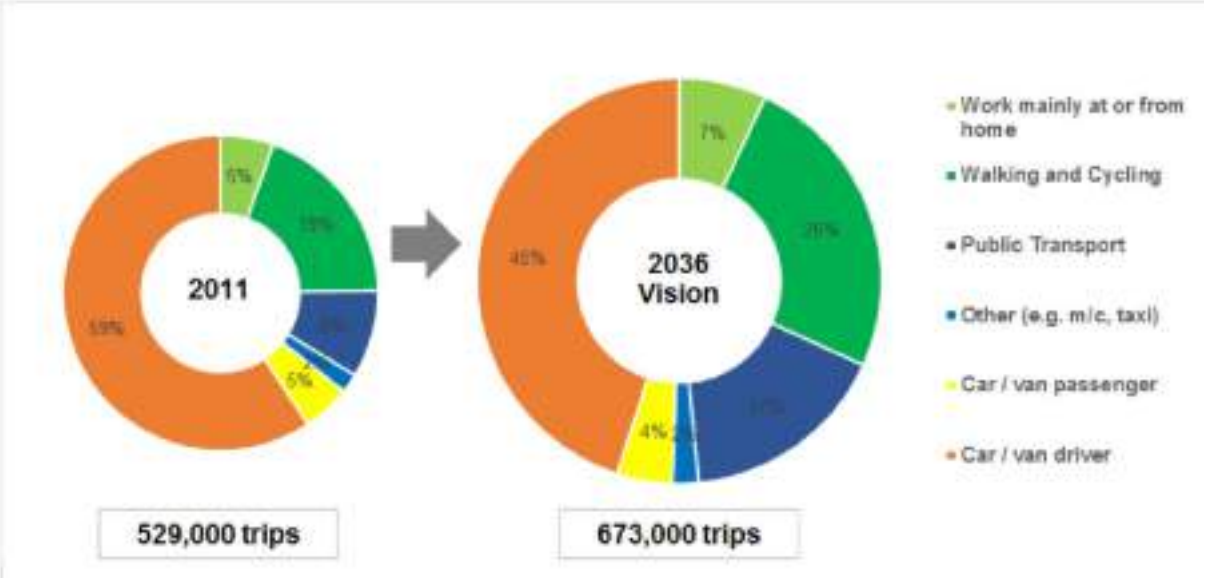
11. The initial modelling work prepared for the VTS included the application of a blanket TEMPRO growth across the network plus the addition of traffic associated with the Woodlands and Buckover schemes.

12. This method has been revised to enable a more realistic assessment and which doesn't include a substantial element of double counting. For the purpose of this additional study the TEMPRO growth factors have been revised down to ensure that traffic associated with JSP sites are not double counted.

13. Notwithstanding the above, consideration needs to be given to the overarching principles and vision of the JSP and JTS

14. Figure 12.2 of the JTS, as show below, outlines the forecast differences in commuting between 2011 and 2036. It is estimated that there will be a 28% rise in trips by all modes in the West of England; this is shown below by the increase from 529,000 to 673,000 trips. However, the vision considered a shift away from the private car to more sustainable modes of travel. The vison confirms that whilst the number of tips would increase, the number of vehicle trips will in fact decrease.

Figure 12-2 Commuting in the West of England in 2011 and 2036 (mode split)



15. From Figure 12.2 above, it can be calculated that in 2011, there will be an estimated 317,400 vehicular trips. In 2036, there will be an estimated 309,580 vehicular trips; this equates to a reduction of 7,820 vehicular trips (equivalent of 2.5%) over the 25-year period. The application of any TEMPRO Growth to the network (as per this assessment work) therefore ensures an extremely robust assessment and presents an absolute worst case scenario for assessment.

16. It is stated within the JTS that the reasons for the decrease in car trips include:

Future numbers of people driving will depend on the scale of shift to other modes and, increasingly, the adoption of new models of car ownership. People are increasingly choosing to avoid buying cars and instead use car clubs and other forms of mobility as a service. Furthermore, measures to introduce congestion charging in urban centres will significantly affect travel choices.

The largest shifts from driving to walking, cycling and public transport will take place in the Bristol urban area, which will reflect the ability to make journeys using different travel options.

17. The Transport Vision study acknowledges that to reduce traffic delays, high levels of mode shift in the urban areas is required. This includes the future management of road space on radial routes into Bristol.

18. In light of the above, the development at Woodlands is likely to deliver a higher shift away from the private car than what the West of England area would experience in totality. For example, the JSP seeks to increase the proportion of walking and cycling trips by 30% (6% points) over a 25 year period. However, SUSTRANS have reported (based on evidence) that there has been an increase of 85% in cycling trip alone in a 7 year period (2008 to 2015). We are therefore of the opinion that the Woodlands scheme alongside the SUSTRANS cycling strategy as appended to the VTS can deliver an even greater shift away from the private car, not only for the Woodland's scheme but also Bristol urban area as a whole. This has not been quantified within this assessment work and therefore results in a robust assessment.

Modelling Assessment

19. Further analysis of the VTS VISSIM model has been undertaken to consider the overall impact of the draft JSP sites per Table 1 as well as the Woodlands development. The assessment will focus on the overall impact of the Woodlands development on the network against a baseline scenario of 2036 plus the presence of draft JSP site traffic on the network (and TEMPRO growth). The assessment takes into account the key model outputs of overall network performance which is represented in overall delay and journey speed across the network. Further analysis of impacts on queue length and delay is included.
20. The full model results are provided at **Appendix D**.
21. Three scenarios have been modelled, as follows:

    - Scenario 1: 2017 Base
    - Scenario 2: 2036 Base + Draft JSP Allocation + TEMPRO growth
    - Scenario 3: 2036 Base + Draft JSP Allocation + TEMPRO growth + Woodlands Traffic

22. It should be noted that the with the Woodlands development scenario the road network has been updated within the model to include the Spine Road through the site which connects Hortham Lane with Trench Lane.
23. The detailed VISSIM model runs have been optimised so as to present the best overall network performance in each scenario assessed. This provides a like for like comparison of the impact of the Woodlands development. This assessment is robust because:

    - TEMPRO growth has been applied to Background traffic whist the JSP states that traffic flows would reduce 2.5% by 2036;
    - The modelling work does not account for any mitigation associated with the Woodlands scheme or the JSP;
    - Traffic associated with the current Woodlands site operations has not been removed from the network, therefore Woodlands development traffic has been overestimated by 136 vehicles during the AM peak hour and 118 during the PM peak hour.

Network Performance

24. Table 6 provides a summary of the traffic impact of the Woodlands scheme in Delay terms, whilst Table 7 summarises the impact in vehicle speed terms when comparing scenario's 2 and 3.

Table 6: Delay across the Network

Delay Across the Network				
	Scenario 1	**Scenario 2**	**Scenario 3**	**Impact**
	2017 Base	**2036 Base + Draft Allocation (plus TEMPRO* Growth)**	**Scenario 2 + Woodlands**	
AM Peak (0800 to 0900)	106	164	189	+25 Seconds
PM Peak (1700 to 1800)	71	288	320	+32 Seconds

**TEMPRO Growth Revised to remove any double counting of traffic*

Table 7: Average Journey Speed across the Network

Average Journey Speed across the network				
	Scenario 1	**Scenario 2**	**Scenario 3**	**Impact**
	2017 Base	**2036 Base + Draft Allocation (plus TEMPRO* Growth)**	**Scenario 2 + Woodlands**	
AM Peak (0800 to 0900)	20	18	18	0 mph
PM Peak (1700 to 1800)	25	13	12	-1 mph

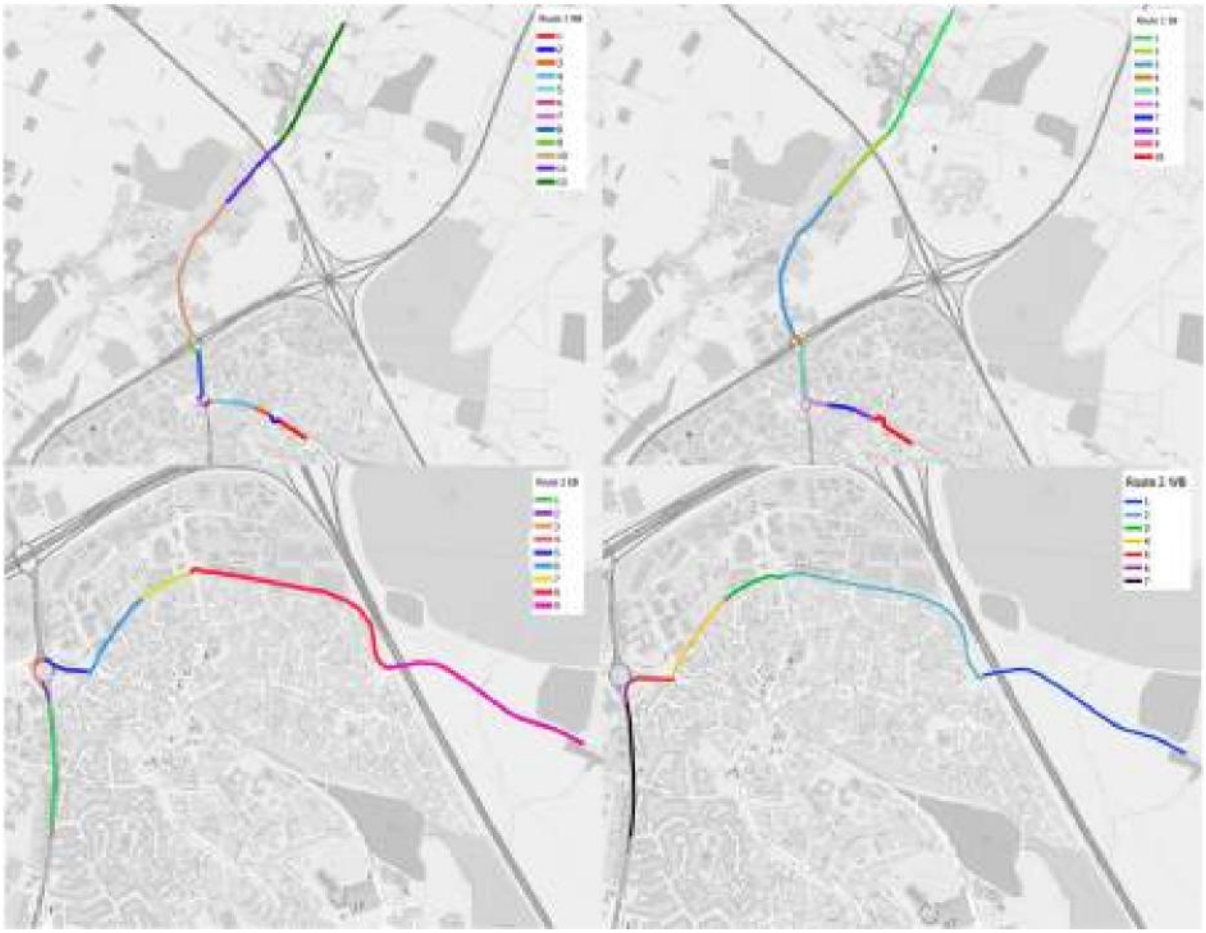
25. The network study area is centralised around the Woodlands development and does not assess the equivalent localised and concentrated effects immediately surrounding the draft allocation sites or for the West of England as a whole. Therefore, the associated impacts and measured in an area where they will be at their greatest and arguably no greater than or less than any other localised impacts of the draft allocated site.

26. The order of magnitude in change in delay across the network is not considered significant in the context of the NPPF. The impact of the development is considered minimal with increases in delay forecast to be 25 seconds during the AM peak hour and 32 seconds during the PM peak hour. This has a negligible impact on average journey speeds with no reported changes during the AM Peak hour and a reduction of 1mph during the PM peak. This level of impact is negligible.

27. Notwithstanding the above impacts, the overall vision of the JSP and JTS is to maximise the proportion of sustainable trips with a corresponding reduction in car travel. To deliver this vision in the most efficient way means development on appropriate sites which can maximise trips by sustainable modes. The Woodlands site is the most qualified to actually deliver the vision of the JSP and JTS as set out in section 2.33 to 2.5 of the VTS, given its proximity to existing and proposed employment opportunities by foot or by bike which outperforms all draft allocation sites to the north of Bristol.

Journey Time

28. Journey time statistics have been taken from the model output files and is for the routes shown on the plan below.



29. Table 8 provides a summary of the impact of the development in journey times along the routes identified above.

Table 8: Impact on Journey Time

Route	Direction	AM	PM
Route 1	NB	-54	-103
	SB	-21	142
Route 2	EB	21	17
	WB	-266	214

Route 1

30. The development proposal shows a significant improvement to route 1 during the AM peak hour with a reduction in journey time along the northbound (-54 seconds) and southbound (-21 seconds) route during the AM peak hour.

31. During the PM peak hour, the development will reduce the journey time for the northbound route by 103 seconds, however the southbound route would experience an increase of around 142 seconds. This level of delay is experienced on the approach to the M5 along the A38 from the north.

32. This should be considered in the context that the above assessment has been undertaken without the implementation of any mitigation associated with the development and neither has it considered any mitigation associated with the JSP and JTS. It is also based on a very robust assessment methodology as set out in paragraph 21.

Route 2

33. The development will have a minimal impact on journey time along the eastbound route during the AM and PM peak hour which is forecast to experience a modest increase in journey time; by 21 seconds during the AM peak hour and 17 seconds during the PM peak hour. This level of increased delay is not unexpected given its proximity to the Woodlands site and is minimal.

34. With regards to the westbound route the development results in a reduced journey time during the AM peak hour by around 266 seconds providing an overall benefit to this route. During the PM peak hour the westbound journey length is expected to increase by 214 seconds.

35. Further assessment of the model confirms that this delay is experienced from the Woodlands Lane / Bradley Stoke Way junction and along Woodlands Lane itself. The model confirms there is no impact on journey time on the approach to and on the Aztec West junction. The increase in delay is confined to the local highway network rather than the strategic network.

36. The Woodlands traffic generation forecast is robust and does not represent the net change in traffic associated with the site, therefore the assumed Woodlands traffic overestimates traffic by around 136 vehicle movements during the AM peak hour and 118 vehicles over the PM Peak hour. In other words the assessment has not removed the existing Woodlands site traffic from the network. The assessment work also does not account for any reduction in base traffic as a result of committed sustainable access schemes such as the Bristol metrobus or JSP proposed schemes.

37. A robust sustainable access strategy is being developed for the site, which would not only provide a reduction in car travel from the development, but also the residential area of Bradley Stoke which includes around 5000 households. As such the Sustainable Access Strategy would reduce the level of delay experienced along Woodlands Lane and generally within the area. This is primarily focuses on creating high quality cycle networks connecting the Woodlands site to key employment and other destinations. This is set out within the SUSTRANS report as submitted as evidence.

38. It should also be noted that the modelling work does not account for drivers altering the time of travel to before or after the traditional peak hours as modelled. If drivers considered the level of delay to be excessive then they could simply change their travel time to before or after the traditional peak hours. This response is becoming more prevalent with the advent of increased application of flexible working hours.

39. It is therefore considered that a more refined assessment would demonstrate a reduced level of delay along Woodlands Lane. However, this needs to be considered in the context of the impact of the Woodlands scheme on the overall impact on the network which is minimal (Table 6 and 7).

Queue Lengths

40. Tables 9 to 13 shows the queue lengths at key junctions during the AM and PM peak hours. The VISSIM model outlines queue length in metres whilst these have been converted into vehicles (assumed average PCU of 5.75m per PCU) for inclusion within this report.

Table 9: A38/M5 Junction

Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	Impact	2036 Base + CD	2036 Base + CD + Woodlands	Impact
A38 Gloucester Road North	34	28	-6	76	79	3
M5 East	44	50	6	72	84	12
A38 Gloucester Road South	5	5	0	76	75	-1
M5 West	10	18	8	57	47	-9

41. As shown in Table 9, the impact of the development on queueing at the A38 / M5 junction is minimal. The overall impact is an increase of 8 vehicles queuing at this junction during the AM peak hour, whilst the impact during the PM peak equates to 5 additional vehicles queuing.

42. The above is reported prior to the implementation of any mitigation measures and based on an extremely robust assessment methodology.

Table 10: Aztec West Roundabout

Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	Impact	2036 Base + CD	2036 Base + CD + Woodlands	Impact
A38 Gloucester Road North (Ahead/Right)	54	51	-3	2	2	0
A38 Gloucester Road North (Left)	6	8	2	2	2	0
Bradley Stoke Way	21	12	-9	19	15	-4
A38 Gloucester Road South	79	80	1	85	84	0
Park Avenue	1	1	0	35	31	-3

43. As shown in table 10 the proposed development will generally have a positive impact on the level of queuing at the Aztec West roundabout. This is primarily due to the development Spine Road which connects Hortham Lane with Trench Lane and therefore provides an element of relief to any congestion at the Aztec West Roundabout and the general area. The overall impact is a reduction of 9 vehicles queuing at this junction during the AM peak hour, whilst the reduction in queuing would be 7 vehicles during the PM peak hour.

Table 11: Woodlands Lane

Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	Impact	2036 Base + CD	2036 Base + CD + Woodlands	Impact
Woodlands Lane (Right)	54	6	-48	44	71	27
Woodlands Lane (Left)	28	0	-28	33	71	38
Bradley Stoke Way East	4	3	-1	32	17	-15
Bradley Stoke Way West	2	2	0	4	3	0

44. The modelling result show a reduction (77 vehicles) in queueing at the Woodlands Lane Junction during the AM peak hour, whilst the PM peak hour will experience an increase in queuing of 49 vehicles. This increase is experience on the Woodlands Lane approach.

45. An increase in queue length at the Woodland Lane approach corresponds to an increase in delay of 214 seconds between the site access and the Woodlands Lane / Bradley Stoke Way junction.

46. Any increase in queue lengths and delay need to be considered in the context of the impact of the overall network which is minimal. Consideration also needs to be given to the fact that there would be a significant benefit during the AM peak hour and that the modelling work represents a very robust methodology.

Table 12: Pear Tree / Bradley Stoke Way

Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	Impact	2036 Base + CD	2036 Base + CD + Woodlands	Impact
Bradley Stoke Way West	0	0	0	1	1	-1
Pear Tree Road	0	0	0	1	1	-1
Bowsland Way	0	0	0	1	1	0
Bradley Stoke Way East	0	0	0	5	1	-5
Brook Way	1	1	0	10	3	-7

47. As shown in table 12 the proposed development will generally have a positive impact on the level of queuing at the Pear Tree / Bradley Stoke Way roundabout. The overall impact is no change in queueing during the AM peak hour, whilst there will be a reduction in queuing vehicles of 14 vehicles during the PM peak hour.

Table 13: A38 / Hortham Lane

Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	Impact	2036 Base + CD	2036 Base + CD + Woodlands	Impact
A38 Gloucester Road South	2	4	1	15	21	7
A38 Gloucester Road North	51	66	16	52	48	-4
Hortham Lane (Left)	3	12	9	1	2	1
Hortham Lane (Right)	3	12	9	0	2	1

48. As shown in Table 13 the development is forecast to result in an increase in queuing at the A38 Hortham Lane Junction. During the AM peak hour this equates to 45 vehicles whilst the impact during the PM equates to an additional 5 vehicles queueing. This is not unexpected as the development includes a new link connecting Hortham Lane with Trench Lane and therefore additional traffic will be routed via Hortham Lane rather than on the Aztec West and M5 / A38 junction. Whilst the modelling work is forecast to increase queuing at the junction, the journey time assessment confirms that the increase in delay at this junction is minimal.

Summary and Conclusion

49. The detailed modelling work confirms that the overall impact of the development at Woodlands on the adjacent road network is minimal even in the event that it is allocated as an additional site over and above those currently proposed for allocation in the JSP. The development is expected to increase delay across the modelled network by only 25 seconds during the AM peak hour and 32 seconds during the PM peak hour. This level of increase in negligible and in all likelihood will be lower following the implementation of any mitigation (such as sustainable access measures).

50. These increases in delay are based on an extremely robust assessment as the model has been developed on the basis of applying a general background growth to the observed 2017 traffic surveys plus the addition of draft JSP site traffic. This overestimates traffic flows as the JSP vision on transport is to deliver a 2.5% reduction in car trips across the region during the plan period up to 2036.

51. The Woodlands traffic generation forecast is robust and does not represent the net change in traffic associated with the site, therefore the assumed Woodlands traffic overestimates traffic by around 136 vehicle movements during the AM peak hour and 118 vehicles over the PM Peak hour. In other words, the assessment has not removed the existing Woodlands site traffic from the network. The assessment work also does not account for any reduction in base traffic as a result of committed sustainable access schemes such as the Bristol Metrobus or JSP proposed schemes.

52. The traffic numbers do not take into account any reduction in car travel associated with the JSP and JST schemes as well as mitigation associated with the development itself.

53. The development therefore has a limited impact on the adjacent road network based on an extremely robust assessment methodology. The principle of development on the Woodlands site is in line with the requirements and the vision of the JST and JSP in transport terms.

54. A key vision of the JSP is to reduce the overall proportion of trips by car whilst increasing trip by active travel and sustainable modes. A key driver in achieving this is to carefully locate development that can realistically and cost effectively maximise travel by sustainable modes. The Woodlands site is by far (of the draft JSP sites considered within the assessment) the most qualified site to deliver this (cost effectively) given its proximity to existing and proposed employment. The Woodlands site is closest to any draft employment allocation when compared to the draft housing allocations assessed within this note.

APPENDIX A: EMPLOYMENT TRICS OUTPUTS

Calculation Reference: AUDIT-152303-161024-1044

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 02 - EMPLOYMENT
Category : A - OFFICE

VEHICLES

Selected regions and areas:

02	**SOUTH EAST**		
	ES	EAST SUSSEX	1 days
	HC	HAMPSHIRE	2 days
	KC	KENT	3 days
	SC	SURREY	4 days
04	**EAST ANGLIA**		
	CA	CAMBRIDGESHIRE	1 days
	SF	SUFFOLK	1 days
06	**WEST MIDLANDS**		
	WM	WEST MIDLANDS	1 days
07	**YORKSHIRE & NORTH LINCOLNSHIRE**		
	WY	WEST YORKSHIRE	1 days
08	**NORTH WEST**		
	LC	LANCASHIRE	1 days
09	**NORTH**		
	DH	DURHAM	2 days
	TW	TYNE & WEAR	4 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Filtering Stage 2 selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Gross floor area
Actual Range: 186 to 70291 (units: sqm)
Range Selected by User: 186 to 175000 (units: sqm)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/08 to 26/11/15

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	5 days
Tuesday	11 days
Wednesday	1 days
Thursday	3 days
Friday	1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	21 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Suburban Area (PPS6 Out of Centre)	11
Edge of Town	10

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Filtering Stage 3 selection:

Use Class:

B1	21 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

Not Known	1 days
1,001 to 5,000	1 days
5,001 to 10,000	7 days
10,001 to 15,000	5 days
15,001 to 20,000	2 days
25,001 to 50,000	5 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

Not Known	1 days
25,001 to 50,000	1 days
75,001 to 100,000	5 days
100,001 to 125,000	1 days
125,001 to 250,000	4 days
250,001 to 500,000	7 days
500,001 or More	2 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.5 or Less	1 days
0.6 to 1.0	10 days
1.1 to 1.5	9 days
1.6 to 2.0	1 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

Yes	10 days
No	11 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

LIST OF SITES relevant to selection parameters

1 CA-02-A-04 OFFICE CAMBRIDGESHIRE
BRETTON WAY

PETERBOROUGH
Edge of Town
Commercial Zone
Total Gross floor area: 6483 sqm
Survey date: THURSDAY 20/10/11 Survey Type: MANUAL

2 DH-02-A-01 RPMI OFFICES DURHAM
BRINKBURN ROAD

DARLINGTON
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Gross floor area: 3372 sqm
Survey date: FRIDAY 05/11/10 Survey Type: MANUAL

3 DH-02-A-02 CONSTRUCTION COMPANY DURHAM
DURHAM ROAD
BOWBURN
NEAR DURHAM
Edge of Town
Industrial Zone
Total Gross floor area: 2000 sqm
Survey date: TUESDAY 27/11/12 Survey Type: MANUAL

4 ES-02-A-11 HOUSING COMPANY EAST SUSSEX
THE SIDINGS
ORE VALLEY
HASTINGS
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Gross floor area: 186 sqm
Survey date: TUESDAY 17/11/15 Survey Type: MANUAL

5 HC-02-A-11 DIY CO. HQ HAMPSHIRE
CHESTNUT AVENUE

CHANDLER'S FORD
Edge of Town
Commercial Zone
Total Gross floor area: 26100 sqm
Survey date: MONDAY 17/10/11 Survey Type: MANUAL

6 HC-02-A-12 HMRC HAMPSHIRE
NORTHERN ROAD
COSHAM
PORTSMOUTH
Suburban Area (PPS6 Out of Centre)
No Sub Category
Total Gross floor area: 10100 sqm
Survey date: MONDAY 23/11/15 Survey Type: MANUAL

7 KC-02-A-06 LAND REGISTRY KENT
FOREST ROAD
CAMDEN PARK
TUNBRIDGE WELLS
Edge of Town
Residential Zone
Total Gross floor area: 5677 sqm
Survey date: TUESDAY 01/12/09 Survey Type: MANUAL

LIST OF SITES relevant to selection parameters (Cont.)

8 KC-02-A-07 KCC HIGHWAYS REG. KENT
KAVELIN WAY
HENWOOD IND. ESTATE
ASHFORD
Edge of Town
Commercial Zone
Total Gross floor area: 2525 sqm
Survey date: MONDAY 05/12/11 Survey Type: MANUAL

9 KC-02-A-08 KCC HIGHWAYS REG. OFFICE KENT
ST MICHAEL'S CLOSE
CLAY WOOD
AYLESFORD
Edge of Town
Industrial Zone
Total Gross floor area: 3168 sqm
Survey date: MONDAY 28/11/11 Survey Type: MANUAL

10 LC-02-A-09 OFFICES LANCASHIRE
FURTHERGATE

BLACKBURN
Suburban Area (PPS6 Out of Centre)
Built-Up Zone
Total Gross floor area: 2600 sqm
Survey date: TUESDAY 04/06/13 Survey Type: MANUAL

11 SC-02-A-14 UNILEVER SURREY
SPRINGFIELD DRIVE

LEATHERHEAD
Edge of Town
Commercial Zone
Total Gross floor area: 19974 sqm
Survey date: TUESDAY 10/03/09 Survey Type: MANUAL

12 SC-02-A-15 ACCOUNTANTS SURREY
BOXGROVE ROAD

GUILDFORD
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Gross floor area: 1896 sqm
Survey date: TUESDAY 05/10/10 Survey Type: MANUAL

13 SC-02-A-16 BANK OF AMERICA SURREY
STANHOPE ROAD

CAMBERLEY
Edge of Town
Commercial Zone
Total Gross floor area: 39230 sqm
Survey date: TUESDAY 10/05/11 Survey Type: MANUAL

LIST OF SITES relevant to selection parameters (Cont.)

14 SC-02-A-17 PHARMACEUTICALS SURREY
ST GEORGE'S AVENUE
THE HEATH
WEYBRIDGE
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Gross floor area: 10293 sqm
Survey date: TUESDAY 18/10/11 Survey Type: MANUAL

15 SF-02-A-01 COUNCIL OFFICES SUFFOLK
BEETONS WAY

BURY ST. EDMUNDS
Suburban Area (PPS6 Out of Centre)
Industrial Zone
Total Gross floor area: 8000 sqm
Survey date: MONDAY 27/09/10 Survey Type: MANUAL

16 TW-02-A-03 DEVELOPMENT AGENCY TYNE & WEAR
KINGFISHER BOULEVARD
LEMINGTON
NEWCASTLE UPON TYNE
Edge of Town
Commercial Zone
Total Gross floor area: 6480 sqm
Survey date: THURSDAY 11/12/08 Survey Type: MANUAL

17 TW-02-A-04 HOUSING CO. TYNE & WEAR
EARLSWAY
TEAM VALLEY TRAD. EST.
GATESHEAD
Edge of Town
Industrial Zone
Total Gross floor area: 2500 sqm
Survey date: TUESDAY 29/09/09 Survey Type: MANUAL

18 TW-02-A-05 TELEVISION CO. TYNE & WEAR
DELTA BANK ROAD
METRO RIVERSIDE PARK
GATESHEAD
Suburban Area (PPS6 Out of Centre)
Commercial Zone
Total Gross floor area: 1500 sqm
Survey date: TUESDAY 29/09/09 Survey Type: MANUAL

19 TW-02-A-06 GOVERNMENT OFFICES TYNE & WEAR
BENTON PARK ROAD
LONGBENTON
NEWCASTLE UPON TYNE
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Gross floor area: 70291 sqm
Survey date: WEDNESDAY 25/11/09 Survey Type: MANUAL

20 WM-02-A-04 OFFICE WEST MIDLANDS
BOURNVILLE LANE

BIRMINGHAM
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Gross floor area: 1800 sqm
Survey date: TUESDAY 10/11/15 Survey Type: MANUAL

LIST OF SITES relevant to selection parameters (Cont.)

21 WY-02-A-03 OFFICE WEST YORKSHIRE
VICTORIA ROAD
HEADINGLEY
LEEDS
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Gross floor area: 2696 sqm
Survey date: THURSDAY 17/06/10 Survey Type: MANUAL

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
VEHICLES
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00	1	19974	0.020	1	19974	0.010	1	19974	0.030
06:00 - 07:00	3	33455	0.733	3	33455	0.187	3	33455	0.920
07:00 - 08:00	21	10803	0.877	21	10803	0.207	21	10803	1.084
08:00 - 09:00	21	10803	1.410	21	10803	0.265	21	10803	1.675
09:00 - 10:00	21	10803	0.818	21	10803	0.244	21	10803	1.062
10:00 - 11:00	21	10803	0.336	21	10803	0.145	21	10803	0.481
11:00 - 12:00	21	10803	0.266	21	10803	0.185	21	10803	0.451
12:00 - 13:00	21	10803	0.264	21	10803	0.301	21	10803	0.565
13:00 - 14:00	21	10803	0.312	21	10803	0.269	21	10803	0.581
14:00 - 15:00	21	10803	0.291	21	10803	0.361	21	10803	0.652
15:00 - 16:00	21	10803	0.265	21	10803	0.671	21	10803	0.936
16:00 - 17:00	21	10803	0.248	21	10803	1.064	21	10803	1.312
17:00 - 18:00	21	10803	0.195	21	10803	1.211	21	10803	1.406
18:00 - 19:00	21	10803	0.120	21	10803	0.518	21	10803	0.638
19:00 - 20:00	1	70291	0.175	1	70291	0.218	1	70291	0.393
20:00 - 21:00	1	70291	0.185	1	70291	0.198	1	70291	0.383
21:00 - 22:00	1	70291	0.084	1	70291	0.182	1	70291	0.266
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			6.599			6.236			12.835

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	186 - 70291 (units: sqm)
Survey date date range:	01/01/08 - 26/11/15
Number of weekdays (Monday-Friday):	21
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	3
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
TAXIS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00	1	19974	0.000	1	19974	0.000	1	19974	0.000
06:00 - 07:00	3	33455	0.008	3	33455	0.007	3	33455	0.015
07:00 - 08:00	21	10803	0.011	21	10803	0.010	21	10803	0.021
08:00 - 09:00	21	10803	0.013	21	10803	0.014	21	10803	0.027
09:00 - 10:00	21	10803	0.025	21	10803	0.022	21	10803	0.047
10:00 - 11:00	21	10803	0.009	21	10803	0.011	21	10803	0.020
11:00 - 12:00	21	10803	0.007	21	10803	0.007	21	10803	0.014
12:00 - 13:00	21	10803	0.006	21	10803	0.006	21	10803	0.012
13:00 - 14:00	21	10803	0.006	21	10803	0.006	21	10803	0.012
14:00 - 15:00	21	10803	0.006	21	10803	0.006	21	10803	0.012
15:00 - 16:00	21	10803	0.009	21	10803	0.008	21	10803	0.017
16:00 - 17:00	21	10803	0.007	21	10803	0.007	21	10803	0.014
17:00 - 18:00	21	10803	0.009	21	10803	0.010	21	10803	0.019
18:00 - 19:00	21	10803	0.007	21	10803	0.007	21	10803	0.014
19:00 - 20:00	1	70291	0.000	1	70291	0.000	1	70291	0.000
20:00 - 21:00	1	70291	0.004	1	70291	0.004	1	70291	0.008
21:00 - 22:00	1	70291	0.000	1	70291	0.000	1	70291	0.000
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.127			0.125			0.252

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	186 - 70291 (units: sqm)
Survey date date range:	01/01/08 - 26/11/15
Number of weekdays (Monday-Friday):	21
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	3
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
OGVS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00	1	19974	0.000	1	19974	0.000	1	19974	0.000
06:00 - 07:00	3	33455	0.006	3	33455	0.004	3	33455	0.010
07:00 - 08:00	21	10803	0.004	21	10803	0.004	21	10803	0.008
08:00 - 09:00	21	10803	0.006	21	10803	0.004	21	10803	0.010
09:00 - 10:00	21	10803	0.006	21	10803	0.007	21	10803	0.013
10:00 - 11:00	21	10803	0.006	21	10803	0.005	21	10803	0.011
11:00 - 12:00	21	10803	0.007	21	10803	0.007	21	10803	0.014
12:00 - 13:00	21	10803	0.004	21	10803	0.003	21	10803	0.007
13:00 - 14:00	21	10803	0.003	21	10803	0.004	21	10803	0.007
14:00 - 15:00	21	10803	0.004	21	10803	0.004	21	10803	0.008
15:00 - 16:00	21	10803	0.003	21	10803	0.004	21	10803	0.007
16:00 - 17:00	21	10803	0.004	21	10803	0.003	21	10803	0.007
17:00 - 18:00	21	10803	0.000	21	10803	0.002	21	10803	0.002
18:00 - 19:00	21	10803	0.001	21	10803	0.000	21	10803	0.001
19:00 - 20:00	1	70291	0.001	1	70291	0.001	1	70291	0.002
20:00 - 21:00	1	70291	0.000	1	70291	0.001	1	70291	0.001
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.055			0.053			0.108

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	186 - 70291 (units: sqm)
Survey date date range:	01/01/08 - 26/11/15
Number of weekdays (Monday-Friday):	21
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	3
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
PSVS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00	1	19974	0.000	1	19974	0.000	1	19974	0.000
06:00 - 07:00	3	33455	0.002	3	33455	0.002	3	33455	0.004
07:00 - 08:00	21	10803	0.004	21	10803	0.003	21	10803	0.007
08:00 - 09:00	21	10803	0.005	21	10803	0.004	21	10803	0.009
09:00 - 10:00	21	10803	0.004	21	10803	0.004	21	10803	0.008
10:00 - 11:00	21	10803	0.004	21	10803	0.004	21	10803	0.008
11:00 - 12:00	21	10803	0.004	21	10803	0.003	21	10803	0.007
12:00 - 13:00	21	10803	0.004	21	10803	0.004	21	10803	0.008
13:00 - 14:00	21	10803	0.005	21	10803	0.004	21	10803	0.009
14:00 - 15:00	21	10803	0.004	21	10803	0.004	21	10803	0.008
15:00 - 16:00	21	10803	0.006	21	10803	0.006	21	10803	0.012
16:00 - 17:00	21	10803	0.004	21	10803	0.006	21	10803	0.010
17:00 - 18:00	21	10803	0.004	21	10803	0.004	21	10803	0.008
18:00 - 19:00	21	10803	0.002	21	10803	0.003	21	10803	0.005
19:00 - 20:00	1	70291	0.000	1	70291	0.000	1	70291	0.000
20:00 - 21:00	1	70291	0.000	1	70291	0.000	1	70291	0.000
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.052			0.051			0.103

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	186 - 70291 (units: sqm)
Survey date date range:	01/01/08 - 26/11/15
Number of weekdays (Monday-Friday):	21
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	3
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
CYCLISTS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00	1	19974	0.000	1	19974	0.000	1	19974	0.000
06:00 - 07:00	3	33455	0.008	3	33455	0.005	3	33455	0.013
07:00 - 08:00	21	10803	0.013	21	10803	0.002	21	10803	0.015
08:00 - 09:00	21	10803	0.035	21	10803	0.001	21	10803	0.036
09:00 - 10:00	21	10803	0.008	21	10803	0.001	21	10803	0.009
10:00 - 11:00	21	10803	0.004	21	10803	0.002	21	10803	0.006
11:00 - 12:00	21	10803	0.004	21	10803	0.001	21	10803	0.005
12:00 - 13:00	21	10803	0.002	21	10803	0.002	21	10803	0.004
13:00 - 14:00	21	10803	0.003	21	10803	0.003	21	10803	0.006
14:00 - 15:00	21	10803	0.004	21	10803	0.003	21	10803	0.007
15:00 - 16:00	21	10803	0.004	21	10803	0.007	21	10803	0.011
16:00 - 17:00	21	10803	0.003	21	10803	0.018	21	10803	0.021
17:00 - 18:00	21	10803	0.000	21	10803	0.032	21	10803	0.032
18:00 - 19:00	21	10803	0.001	21	10803	0.006	21	10803	0.007
19:00 - 20:00	1	70291	0.003	1	70291	0.004	1	70291	0.007
20:00 - 21:00	1	70291	0.000	1	70291	0.009	1	70291	0.009
21:00 - 22:00				1	70291	0.001			
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.092			0.097			0.188

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	186 - 70291 (units: sqm)
Survey date date range:	01/01/08 - 26/11/15
Number of weekdays (Monday-Friday):	21
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	3
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Calculation Reference: AUDIT-152303-170301-0349

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 02 - EMPLOYMENT
Category : D - INDUSTRIAL ESTATE
VEHICLES

Selected regions and areas:

03	SOUTH WEST		
	CW	CORNWALL	1 days
11	SCOTLAND		
	AG	ANGUS	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Secondary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter:	Gross floor area
Actual Range:	36500 to 64889 (units: sqm)
Range Selected by User:	25000 to 234115 (units: sqm)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/08 to 24/03/14

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	1 days
Friday	1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	2 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Edge of Town	1
Neighbourhood Centre (PPS6 Local Centre)	1

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Residential Zone	1
Village	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Secondary Filtering selection:

Use Class:

B2	2 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

1,000 or Less	1 days
15,001 to 20,000	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

25,001 to 50,000	2 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	1 days
1.1 to 1.5	1 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

No	2 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	2 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 AG-02-D-01 INDUSTRIAL EST. ANGUS
WESTWAY

ARBROATH
Edge of Town
Residential Zone
Total Gross floor area: 64889 sqm
Survey date: FRIDAY 25/05/12 Survey Type: MANUAL

2 CW-02-D-03 IND. ESTATE CORNWALL
LONG ROCK ROAD
LONG ROCK
NEAR PENZANCE
Neighbourhood Centre (PPS6 Local Centre)
Village
Total Gross floor area: 36500 sqm
Survey date: MONDAY 03/10/11 Survey Type: MANUAL

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
VEHICLES
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	2	50695	0.459	2	50695	0.126	2	50695	0.585
08:00 - 09:00	2	50695	0.397	2	50695	0.218	2	50695	0.615
09:00 - 10:00	2	50695	0.253	2	50695	0.216	2	50695	0.469
10:00 - 11:00	2	50695	0.206	2	50695	0.209	2	50695	0.415
11:00 - 12:00	2	50695	0.247	2	50695	0.241	2	50695	0.488
12:00 - 13:00	2	50695	0.231	2	50695	0.270	2	50695	0.501
13:00 - 14:00	2	50695	0.232	2	50695	0.229	2	50695	0.461
14:00 - 15:00	2	50695	0.215	2	50695	0.235	2	50695	0.450
15:00 - 16:00	2	50695	0.187	2	50695	0.229	2	50695	0.416
16:00 - 17:00	2	50695	0.187	2	50695	0.389	2	50695	0.576
17:00 - 18:00	2	50695	0.073	2	50695	0.314	2	50695	0.387
18:00 - 19:00	2	50695	0.076	2	50695	0.109	2	50695	0.185
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			2.763			2.785			5.548

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	36500 - 64889 (units: sqm)
Survey date date range:	01/01/08 - 24/03/14
Number of weekdays (Monday-Friday):	2
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
TAXIS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	2	50695	0.004	2	50695	0.000	2	50695	0.004
08:00 - 09:00	2	50695	0.001	2	50695	0.002	2	50695	0.003
09:00 - 10:00	2	50695	0.004	2	50695	0.004	2	50695	0.008
10:00 - 11:00	2	50695	0.002	2	50695	0.002	2	50695	0.004
11:00 - 12:00	2	50695	0.001	2	50695	0.000	2	50695	0.001
12:00 - 13:00	2	50695	0.002	2	50695	0.002	2	50695	0.004
13:00 - 14:00	2	50695	0.001	2	50695	0.002	2	50695	0.003
14:00 - 15:00	2	50695	0.001	2	50695	0.000	2	50695	0.001
15:00 - 16:00	2	50695	0.001	2	50695	0.002	2	50695	0.003
16:00 - 17:00	2	50695	0.002	2	50695	0.002	2	50695	0.004
17:00 - 18:00	2	50695	0.004	2	50695	0.005	2	50695	0.009
18:00 - 19:00	2	50695	0.002	2	50695	0.002	2	50695	0.004
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.025			0.023			0.048

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	36500 - 64889 (units: sqm)
Survey date date range:	01/01/08 - 24/03/14
Number of weekdays (Monday-Friday):	2
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
OGVS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	2	50695	0.017	2	50695	0.025	2	50695	0.042
08:00 - 09:00	2	50695	0.022	2	50695	0.016	2	50695	0.038
09:00 - 10:00	2	50695	0.027	2	50695	0.026	2	50695	0.053
10:00 - 11:00	2	50695	0.023	2	50695	0.032	2	50695	0.055
11:00 - 12:00	2	50695	0.032	2	50695	0.030	2	50695	0.062
12:00 - 13:00	2	50695	0.018	2	50695	0.022	2	50695	0.040
13:00 - 14:00	2	50695	0.027	2	50695	0.021	2	50695	0.048
14:00 - 15:00	2	50695	0.018	2	50695	0.027	2	50695	0.045
15:00 - 16:00	2	50695	0.020	2	50695	0.020	2	50695	0.040
16:00 - 17:00	2	50695	0.027	2	50695	0.013	2	50695	0.040
17:00 - 18:00	2	50695	0.004	2	50695	0.002	2	50695	0.006
18:00 - 19:00	2	50695	0.001	2	50695	0.000	2	50695	0.001
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.236			0.234			0.470

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	36500 - 64889 (units: sqm)
Survey date date range:	01/01/08 - 24/03/14
Number of weekdays (Monday-Friday):	2
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
PSVS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	2	50695	0.000	2	50695	0.000	2	50695	0.000
08:00 - 09:00	2	50695	0.000	2	50695	0.000	2	50695	0.000
09:00 - 10:00	2	50695	0.004	2	50695	0.001	2	50695	0.005
10:00 - 11:00	2	50695	0.000	2	50695	0.003	2	50695	0.003
11:00 - 12:00	2	50695	0.000	2	50695	0.002	2	50695	0.002
12:00 - 13:00	2	50695	0.000	2	50695	0.000	2	50695	0.000
13:00 - 14:00	2	50695	0.000	2	50695	0.000	2	50695	0.000
14:00 - 15:00	2	50695	0.000	2	50695	0.001	2	50695	0.001
15:00 - 16:00	2	50695	0.000	2	50695	0.002	2	50695	0.002
16:00 - 17:00	2	50695	0.003	2	50695	0.001	2	50695	0.004
17:00 - 18:00	2	50695	0.005	2	50695	0.000	2	50695	0.005
18:00 - 19:00	2	50695	0.006	2	50695	0.002	2	50695	0.008
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.018			0.012			0.030

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	36500 - 64889 (units: sqm)
Survey date date range:	01/01/08 - 24/03/14
Number of weekdays (Monday-Friday):	2
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
CYCLISTS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	2	50695	0.002	2	50695	0.000	2	50695	0.002
08:00 - 09:00	2	50695	0.003	2	50695	0.000	2	50695	0.003
09:00 - 10:00	2	50695	0.001	2	50695	0.000	2	50695	0.001
10:00 - 11:00	2	50695	0.007	2	50695	0.009	2	50695	0.016
11:00 - 12:00	2	50695	0.001	2	50695	0.000	2	50695	0.001
12:00 - 13:00	2	50695	0.000	2	50695	0.002	2	50695	0.002
13:00 - 14:00	2	50695	0.001	2	50695	0.001	2	50695	0.002
14:00 - 15:00	2	50695	0.000	2	50695	0.000	2	50695	0.000
15:00 - 16:00	2	50695	0.001	2	50695	0.000	2	50695	0.001
16:00 - 17:00	2	50695	0.001	2	50695	0.002	2	50695	0.003
17:00 - 18:00	2	50695	0.000	2	50695	0.002	2	50695	0.002
18:00 - 19:00	2	50695	0.001	2	50695	0.000	2	50695	0.001
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.018			0.016			0.034

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	36500 - 64889 (units: sqm)
Survey date date range:	01/01/08 - 24/03/14
Number of weekdays (Monday-Friday):	2
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Calculation Reference: AUDIT-152303-160926-0959

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 02 - EMPLOYMENT
Category : F - WAREHOUSING (COMMERCIAL)
VEHICLES

Selected regions and areas:

02	SOUTH EAST		
	HF	HERTFORDSHIRE	1 days
04	EAST ANGLIA		
	SF	SUFFOLK	1 days
05	EAST MIDLANDS		
	LN	LINCOLNSHIRE	1 days
09	NORTH		
	TV	TEES VALLEY	1 days
10	WALES		
	WR	WREXHAM	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Filtering Stage 2 selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Gross floor area
Actual Range: 9000 to 80066 (units: sqm)
Range Selected by User: 5000 to 80066 (units: sqm)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/08 to 11/07/13

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	1 days
Tuesday	2 days
Thursday	2 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	5 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Suburban Area (PPS6 Out of Centre)	1
Edge of Town	3
Free Standing (PPS6 Out of Town)	1

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Industrial Zone	3
Commercial Zone	1
No Sub Category	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Filtering Stage 3 selection:

Use Class:

B8	5 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

1,000 or Less	1 days
1,001 to 5,000	2 days
10,001 to 15,000	2 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

5,001 to 25,000	1 days
25,001 to 50,000	1 days
50,001 to 75,000	1 days
100,001 to 125,000	1 days
125,001 to 250,000	1 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	1 days
1.1 to 1.5	4 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

Yes	1 days
No	4 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

LIST OF SITES relevant to selection parameters

1 HF-02-F-03 DISTRIBUTION CEN. HERTFORDSHIRE

HATFIELD BUSINESS CEN.
HATFIELD
Edge of Town
Commercial Zone
Total Gross floor area: 80000 sqm
Survey date: THURSDAY 10/07/08 Survey Type: MANUAL

2 LN-02-F-01 BOOK SERVICE LINCOLNSHIRE
TRENT ROAD

GRANTHAM
Edge of Town
No Sub Category
Total Gross floor area: 32300 sqm
Survey date: MONDAY 29/11/10 Survey Type: MANUAL

3 SF-02-F-02 WAREHOUSING SUFFOLK
WALTON ROAD

FELIXSTOWE
Suburban Area (PPS6 Out of Centre)
Industrial Zone
Total Gross floor area: 22270 sqm
Survey date: THURSDAY 11/07/13 Survey Type: MANUAL

4 TV-02-F-02 ARGOS WAREHOUSE TEES VALLEY
ROUNDHOUSE ROAD
FAVERDALE
DARLINGTON
Edge of Town
Industrial Zone
Total Gross floor area: 80066 sqm
Survey date: TUESDAY 07/10/08 Survey Type: MANUAL

5 WR-02-F-01 WAREHOUSE WREXHAM
UNIT 1-2 PACIFIC PARK
WREXHAM IND. ESTATE
NEAR WREXHAM
Free Standing (PPS6 Out of Town)
Industrial Zone
Total Gross floor area: 9000 sqm
Survey date: TUESDAY 18/10/11 Survey Type: MANUAL

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
VEHICLES
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 00:30									
00:30 - 01:00									
01:00 - 01:30									
01:30 - 02:00									
02:00 - 02:30									
02:30 - 03:00									
03:00 - 03:30									
03:30 - 04:00									
04:00 - 04:30									
04:30 - 05:00									
05:00 - 05:30	1	22270	0.013	1	22270	0.018	1	22270	0.031
05:30 - 06:00	1	22270	0.004	1	22270	0.022	1	22270	0.026
06:00 - 06:30	1	22270	0.018	1	22270	0.022	1	22270	0.040
06:30 - 07:00	1	22270	0.040	1	22270	0.040	1	22270	0.080
07:00 - 07:30	5	44727	0.026	5	44727	0.021	5	44727	0.047
07:30 - 08:00	5	44727	0.043	5	44727	0.028	5	44727	0.071
08:00 - 08:30	5	44727	0.022	5	44727	0.014	5	44727	0.036
08:30 - 09:00	5	44727	0.030	5	44727	0.018	5	44727	0.048
09:00 - 09:30	5	44727	0.033	5	44727	0.019	5	44727	0.052
09:30 - 10:00	5	44727	0.025	5	44727	0.020	5	44727	0.045
10:00 - 10:30	5	44727	0.019	5	44727	0.022	5	44727	0.041
10:30 - 11:00	5	44727	0.023	5	44727	0.018	5	44727	0.041
11:00 - 11:30	5	44727	0.017	5	44727	0.019	5	44727	0.036
11:30 - 12:00	5	44727	0.020	5	44727	0.021	5	44727	0.041
12:00 - 12:30	5	44727	0.024	5	44727	0.023	5	44727	0.047
12:30 - 13:00	5	44727	0.021	5	44727	0.024	5	44727	0.045
13:00 - 13:30	5	44727	0.036	5	44727	0.030	5	44727	0.066
13:30 - 14:00	5	44727	0.055	5	44727	0.039	5	44727	0.094
14:00 - 14:30	5	44727	0.031	5	44727	0.050	5	44727	0.081
14:30 - 15:00	5	44727	0.036	5	44727	0.039	5	44727	0.075
15:00 - 15:30	5	44727	0.030	5	44727	0.045	5	44727	0.075
15:30 - 16:00	5	44727	0.039	5	44727	0.038	5	44727	0.077
16:00 - 16:30	5	44727	0.030	5	44727	0.040	5	44727	0.070
16:30 - 17:00	5	44727	0.023	5	44727	0.040	5	44727	0.063
17:00 - 17:30	5	44727	0.013	5	44727	0.037	5	44727	0.050
17:30 - 18:00	5	44727	0.011	5	44727	0.030	5	44727	0.041
18:00 - 18:30	5	44727	0.008	5	44727	0.023	5	44727	0.031
18:30 - 19:00	5	44727	0.007	5	44727	0.018	5	44727	0.025
19:00 - 19:30	1	22270	0.027	1	22270	0.013	1	22270	0.040
19:30 - 20:00	1	22270	0.009	1	22270	0.018	1	22270	0.027
20:00 - 20:30	1	22270	0.004	1	22270	0.018	1	22270	0.022
20:30 - 21:00	1	22270	0.009	1	22270	0.013	1	22270	0.022
21:00 - 21:30	1	22270	0.018	1	22270	0.009	1	22270	0.027
21:30 - 22:00	1	22270	0.013	1	22270	0.009	1	22270	0.022
22:00 - 22:30									
22:30 - 23:00									
23:00 - 23:30									
23:30 - 24:00									
Total Rates:			0.777			0.858			1.635

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	9000 - 80066 (units: sqm)
Survey date date range:	01/01/08 - 11/07/13
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
TAXIS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 00:30									
00:30 - 01:00									
01:00 - 01:30									
01:30 - 02:00									
02:00 - 02:30									
02:30 - 03:00									
03:00 - 03:30									
03:30 - 04:00									
04:00 - 04:30									
04:30 - 05:00									
05:00 - 05:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
05:30 - 06:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
06:00 - 06:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
06:30 - 07:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
07:00 - 07:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
07:30 - 08:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
08:00 - 08:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
08:30 - 09:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
09:00 - 09:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
09:30 - 10:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
10:00 - 10:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
10:30 - 11:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
11:00 - 11:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
11:30 - 12:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
12:00 - 12:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
12:30 - 13:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
13:00 - 13:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
13:30 - 14:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
14:00 - 14:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
14:30 - 15:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
15:00 - 15:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
15:30 - 16:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
16:00 - 16:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
16:30 - 17:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
17:00 - 17:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
17:30 - 18:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
18:00 - 18:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
18:30 - 19:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
19:00 - 19:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
19:30 - 20:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
20:00 - 20:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
20:30 - 21:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
21:00 - 21:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
21:30 - 22:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
22:00 - 22:30									
22:30 - 23:00									
23:00 - 23:30									
23:30 - 24:00									
Total Rates:			0.000			0.000			0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	9000 - 80066 (units: sqm)
Survey date date range:	01/01/08 - 11/07/13
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
OGVS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 00:30									
00:30 - 01:00									
01:00 - 01:30									
01:30 - 02:00									
02:00 - 02:30									
02:30 - 03:00									
03:00 - 03:30									
03:30 - 04:00									
04:00 - 04:30									
04:30 - 05:00									
05:00 - 05:30	1	22270	0.009	1	22270	0.018	1	22270	0.027
05:30 - 06:00	1	22270	0.004	1	22270	0.022	1	22270	0.026
06:00 - 06:30	1	22270	0.009	1	22270	0.022	1	22270	0.031
06:30 - 07:00	1	22270	0.018	1	22270	0.040	1	22270	0.058
07:00 - 07:30	5	44727	0.005	5	44727	0.005	5	44727	0.010
07:30 - 08:00	5	44727	0.008	5	44727	0.005	5	44727	0.013
08:00 - 08:30	5	44727	0.004	5	44727	0.004	5	44727	0.008
08:30 - 09:00	5	44727	0.004	5	44727	0.004	5	44727	0.008
09:00 - 09:30	5	44727	0.008	5	44727	0.007	5	44727	0.015
09:30 - 10:00	5	44727	0.005	5	44727	0.007	5	44727	0.012
10:00 - 10:30	5	44727	0.009	5	44727	0.008	5	44727	0.017
10:30 - 11:00	5	44727	0.008	5	44727	0.007	5	44727	0.015
11:00 - 11:30	5	44727	0.006	5	44727	0.008	5	44727	0.014
11:30 - 12:00	5	44727	0.005	5	44727	0.008	5	44727	0.013
12:00 - 12:30	5	44727	0.006	5	44727	0.007	5	44727	0.013
12:30 - 13:00	5	44727	0.004	5	44727	0.006	5	44727	0.010
13:00 - 13:30	5	44727	0.005	5	44727	0.006	5	44727	0.011
13:30 - 14:00	5	44727	0.008	5	44727	0.002	5	44727	0.010
14:00 - 14:30	5	44727	0.008	5	44727	0.005	5	44727	0.013
14:30 - 15:00	5	44727	0.007	5	44727	0.006	5	44727	0.013
15:00 - 15:30	5	44727	0.008	5	44727	0.007	5	44727	0.015
15:30 - 16:00	5	44727	0.009	5	44727	0.005	5	44727	0.014
16:00 - 16:30	5	44727	0.008	5	44727	0.003	5	44727	0.011
16:30 - 17:00	5	44727	0.008	5	44727	0.005	5	44727	0.013
17:00 - 17:30	5	44727	0.006	5	44727	0.004	5	44727	0.010
17:30 - 18:00	5	44727	0.003	5	44727	0.006	5	44727	0.009
18:00 - 18:30	5	44727	0.002	5	44727	0.004	5	44727	0.006
18:30 - 19:00	5	44727	0.002	5	44727	0.006	5	44727	0.008
19:00 - 19:30	1	22270	0.013	1	22270	0.013	1	22270	0.026
19:30 - 20:00	1	22270	0.004	1	22270	0.009	1	22270	0.013
20:00 - 20:30	1	22270	0.004	1	22270	0.018	1	22270	0.022
20:30 - 21:00	1	22270	0.009	1	22270	0.009	1	22270	0.018
21:00 - 21:30	1	22270	0.013	1	22270	0.004	1	22270	0.017
21:30 - 22:00	1	22270	0.013	1	22270	0.000	1	22270	0.013
22:00 - 22:30									
22:30 - 23:00									
23:00 - 23:30									
23:30 - 24:00									
Total Rates:			0.242			0.290			0.532

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	9000 - 80066 (units: sqm)
Survey date date range:	01/01/08 - 11/07/13
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
PSVS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 00:30									
00:30 - 01:00									
01:00 - 01:30									
01:30 - 02:00									
02:00 - 02:30									
02:30 - 03:00									
03:00 - 03:30									
03:30 - 04:00									
04:00 - 04:30									
04:30 - 05:00									
05:00 - 05:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
05:30 - 06:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
06:00 - 06:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
06:30 - 07:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
07:00 - 07:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
07:30 - 08:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
08:00 - 08:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
08:30 - 09:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
09:00 - 09:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
09:30 - 10:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
10:00 - 10:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
10:30 - 11:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
11:00 - 11:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
11:30 - 12:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
12:00 - 12:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
12:30 - 13:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
13:00 - 13:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
13:30 - 14:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
14:00 - 14:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
14:30 - 15:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
15:00 - 15:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
15:30 - 16:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
16:00 - 16:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
16:30 - 17:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
17:00 - 17:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
17:30 - 18:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
18:00 - 18:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
18:30 - 19:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
19:00 - 19:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
19:30 - 20:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
20:00 - 20:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
20:30 - 21:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
21:00 - 21:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
21:30 - 22:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
22:00 - 22:30									
22:30 - 23:00									
23:00 - 23:30									
23:30 - 24:00									
Total Rates:			0.000			0.000			0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	9000 - 80066 (units: sqm)
Survey date date range:	01/01/08 - 11/07/13
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
CYCLISTS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 00:30									
00:30 - 01:00									
01:00 - 01:30									
01:30 - 02:00									
02:00 - 02:30									
02:30 - 03:00									
03:00 - 03:30									
03:30 - 04:00									
04:00 - 04:30									
04:30 - 05:00									
05:00 - 05:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
05:30 - 06:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
06:00 - 06:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
06:30 - 07:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
07:00 - 07:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
07:30 - 08:00	5	44727	0.003	5	44727	0.000	5	44727	0.003
08:00 - 08:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
08:30 - 09:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
09:00 - 09:30	5	44727	0.001	5	44727	0.000	5	44727	0.001
09:30 - 10:00	5	44727	0.001	5	44727	0.000	5	44727	0.001
10:00 - 10:30	5	44727	0.000	5	44727	0.001	5	44727	0.001
10:30 - 11:00	5	44727	0.000	5	44727	0.001	5	44727	0.001
11:00 - 11:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
11:30 - 12:00	5	44727	0.000	5	44727	0.002	5	44727	0.002
12:00 - 12:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
12:30 - 13:00	5	44727	0.000	5	44727	0.002	5	44727	0.002
13:00 - 13:30	5	44727	0.004	5	44727	0.001	5	44727	0.005
13:30 - 14:00	5	44727	0.005	5	44727	0.008	5	44727	0.013
14:00 - 14:30	5	44727	0.001	5	44727	0.007	5	44727	0.008
14:30 - 15:00	5	44727	0.000	5	44727	0.001	5	44727	0.001
15:00 - 15:30	5	44727	0.001	5	44727	0.001	5	44727	0.002
15:30 - 16:00	5	44727	0.002	5	44727	0.002	5	44727	0.004
16:00 - 16:30	5	44727	0.000	5	44727	0.002	5	44727	0.002
16:30 - 17:00	5	44727	0.000	5	44727	0.001	5	44727	0.001
17:00 - 17:30	5	44727	0.000	5	44727	0.004	5	44727	0.004
17:30 - 18:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
18:00 - 18:30	5	44727	0.000	5	44727	0.001	5	44727	0.001
18:30 - 19:00	5	44727	0.001	5	44727	0.001	5	44727	0.002
19:00 - 19:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
19:30 - 20:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
20:00 - 20:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
20:30 - 21:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
21:00 - 21:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
21:30 - 22:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
22:00 - 22:30									
22:30 - 23:00									
23:00 - 23:30									
23:30 - 24:00									
Total Rates:			0.019			0.035			0.054

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	9000 - 80066 (units: sqm)
Survey date date range:	01/01/08 - 11/07/13
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

APPENDIX B: TRAFFIC DATA

Charfield

Land Use	AM Peak			PM Peak		
	IN	OUT	TOT	IN	OUT	TOT
Dwellings	**159**	**406**	**565**	**378**	**236**	**615**
To Emp	*40*	*103*	*144*	*142*	*89*	*230*
To Shop	*6*	*16*	*22*	*46*	*29*	*75*
Leisure	*10*	*26*	*36*	*97*	*61*	*158*
Edu	*80*	*204*	*284*	*16*	*10*	*26*
Other	*22*	*57*	*80*	*77*	*48*	*124*
Employment	**93**	**26**	**119**	**15**	**80**	**94**
Primary Education	**87**	**62**	**148**	**9**	**13**	**22**
Secondary Education	**0**	**0**	**0**	**0**	**0**	**0**
Care Home	**0**	**0**	**0**	**0**	**0**	**0**
TOTAL	**338**	**494**	**832**	**401**	**329**	**731**
To Emp	*25%*	*25%*	*25%*	*37%*	*37%*	*37%*
To Shop	*4%*	*4%*	*4%*	*12%*	*12%*	*12%*
Leisure	*6%*	*6%*	*6%*	*26%*	*26%*	*26%*
Edu	*50%*	*50%*	*50%*	*4%*	*4%*	*4%*
Other	*14%*	*14%*	*14%*	*20%*	*20%*	*20%*

INTERNALISATION

Land Use	AM Peak			PM Peak		
	IN	OUT	TOT	IN	OUT	TOT
Dwellings	**-87**	**-55**	**-142**	**-26**	**-47**	**-73**
To Emp	*-3*	*-9*	*-12*	*-8*	*-1*	*-9*
To Shop	*-1*	*-3*	*-4*	*-9*	*-6*	*-15*
Leisure	*-2*	*-5*	*-7*	*-19*	*-12*	*-32*
Edu	*-49*	*-69*	*-119*	*-11*	*-7*	*-17*
Other						
Employment	**-9**	**-3**	**-12**	**-1**	**-8**	**-9**
Primary Education	**-69**	**-49**	**-119**	**-7**	**-11**	**-17**
Secondary Education				**0**	**0**	**0**
Care Home						
TOTAL	**-166**	**-107**	**-273**	**-34**	**-66**	**-100**

EXTERNAL

Land Use	AM Peak			PM Peak		
	IN	OUT	TOT	IN	OUT	TOT
Dwellings	**72**	**351**	**423**	**352**	**189**	**541**
To Emp	*38*	*94*	*132*	*134*	*87*	*221*
To Shop	*5*	*13*	*18*	*37*	*23*	*60*
Leisure	*8*	*21*	*29*	*78*	*49*	*127*
Edu	*30*	*135*	*165*	*6*	*3*	*9*
Other	*22*	*57*	*80*	*77*	*48*	*124*
Employment	**84**	**23**	**107**	**13**	**72**	**85**
Primary Education	**17**	**12**	**30**	**2**	**3**	**4**
Secondary Education	**0**	**0**	**0**	**0**	**0**	**0**
Care Home	**0**	**0**	**0**	**0**	**0**	**0**
TOTAL	**173**	**387**	**560**	**367**	**263**	**630**

TOTAL External	0800 to 0900			1700 to 1800		
	IN	OUT	TOT	IN	OUT	TOT
Resi and Edu	89	363	453	354	192	546
Employment	84	23	107	13	72	85

0.92

With 8% discount PTP	0800 to 0900			1700 to 1800		
	IN	OUT	TOT	IN	OUT	TOT
Resi and Edu	82	334	417	326	176	502
Employment	77	21	98	12	66	78

Coalpit Heath

Land Use	AM Peak			PM Peak		
	IN	OUT	TOT	IN	OUT	TOT
Dwellings	**217**	**554**	**771**	**516**	**322**	**838**
To Emp	*55*	*141*	*196*	*193*	*121*	*314*
To Shop	*8*	*22*	*30*	*63*	*39*	*102*
Leisure	*14*	*35*	*49*	*133*	*83*	*216*
Edu	*109*	*278*	*387*	*22*	*14*	*36*
Other	*30*	*78*	*108*	*104*	*65*	*170*
Employment	**15**	**4**	**20**	**2**	**13**	**16**
Primary Education	**116**	**82**	**198**	**11**	**18**	**29**
Secondary Education	**0**	**0**	**0**	**0**	**0**	**0**
Care Home	**0**	**0**	**0**	**0**	**0**	**0**
TOTAL	**348**	**641**	**988**	**530**	**353**	**883**
To Emp	*25%*	*25%*	*25%*	*37%*	*37%*	*37%*
To Shop	*4%*	*4%*	*4%*	*12%*	*12%*	*12%*
Leisure	*6%*	*6%*	*6%*	*26%*	*26%*	*26%*
Edu	*50%*	*50%*	*50%*	*4%*	*4%*	*4%*
Other	*14%*	*14%*	*14%*	*20%*	*20%*	*20%*

INTERNALISATION

Land Use	AM Peak			PM Peak		
	IN	OUT	TOT	IN	OUT	TOT
Dwellings	**-105**	**-71**	**-176**	**-34**	**-55**	**-88**
To Emp	*0*	*-2*	*-2*	*-1*	*0*	*-2*
To Shop	*-2*	*-4*	*-6*	*-13*	*-8*	*-20*
Leisure	*-3*	*-7*	*-10*	*-27*	*-17*	*-43*
Edu	*-66*	*-92*	*-158*	*-14*	*-9*	*-23*
Other						
Employment	**-2**	**0**	**-2**	**0**	**-1**	**-2**
Primary Education	**-92**	**-66**	**-158**	**-9**	**-14**	**-23**
Secondary Education				**0**	**0**	**0**
Care Home						
TOTAL	**-199**	**-137**	**-336**	**-43**	**-70**	**-113**

EXTERNAL

Land Use	AM Peak			PM Peak		
	IN	OUT	TOT	IN	OUT	TOT
Dwellings	**111**	**483**	**595**	**482**	**268**	**750**
To Emp	*55*	*139*	*194*	*192*	*121*	*313*
To Shop	*7*	*17*	*24*	*50*	*31*	*82*
Leisure	*11*	*28*	*39*	*106*	*66*	*173*
Edu	*43*	*186*	*229*	*8*	*5*	*13*
Other	*30*	*78*	*108*	*104*	*65*	*170*
Employment	**14**	**4**	**18**	**2**	**12**	**14**
Primary Education	**23**	**16**	**40**	**2**	**4**	**6**
Secondary Education	**0**	**0**	**0**	**0**	**0**	**0**
Care Home	**0**	**0**	**0**	**0**	**0**	**0**
TOTAL	**148**	**504**	**652**	**487**	**283**	**770**

TOTAL External	0800 to 0900			1700 to 1800		
	IN	OUT	TOT	IN	OUT	TOT
Resi and Edu	134	500	634	484	271	756
Employment	14	4	18	2	12	14

0.88

With 12% discount PTP	0800 to 0900			1700 to 1800		
	IN	OUT	TOT	IN	OUT	TOT
Resi and Edu	118	440	558	426	239	665
Employment	12	3	16	2	11	12

Thornbury

Land Use	AM Peak			PM Peak		
	IN	OUT	TOT	IN	OUT	TOT
Dwellings	**60**	**154**	**214**	**143**	**89**	**233**
To Emp	*15*	*39*	*54*	*54*	*34*	*87*
To Shop	*2*	*6*	*8*	*17*	*11*	*28*
Leisure	*4*	*10*	*14*	*37*	*23*	*60*
Edu	*30*	*77*	*108*	*6*	*4*	*10*
Other	*8*	*22*	*30*	*29*	*18*	*47*
Employment	**15**	**4**	**20**	**2**	**13**	**16**
Primary Education	**0**	**0**	**0**	**0**	**0**	**0**
Secondary Education	**0**	**0**	**0**	**0**	**0**	**0**
Care Home	**0**	**0**	**0**	**0**	**0**	**0**
TOTAL	**76**	**158**	**234**	**146**	**103**	**249**
To Emp	*25%*	*25%*	*25%*	*37%*	*37%*	*37%*
To Shop	*4%*	*4%*	*4%*	*12%*	*12%*	*12%*
Leisure	*6%*	*6%*	*6%*	*26%*	*26%*	*26%*
Edu	*50%*	*50%*	*50%*	*4%*	*4%*	*4%*
Other	*14%*	*14%*	*14%*	*20%*	*20%*	*20%*

INTERNALISATION

Land Use	AM Peak			PM Peak		
	IN	OUT	TOT	IN	OUT	TOT
Dwellings	**-5**	**-2**	**-6**	**-7**	**-12**	**-19**
To Emp	*0*	*-2*	*-2*	*-1*	*0*	*-2*
To Shop	*0*	*-1*	*-2*	*-3*	*-2*	*-6*
Leisure	*-1*	*-2*	*-3*	*-7*	*-5*	*-12*
Edu	*0*	*0*	*0*	*0*	*0*	*0*
Other						
Employment	**-2**	**0**	**-2**	**0**	**-1**	**-2**
Primary Education	**0**	**0**	**0**	**0**	**0**	**0**
Secondary Education				**0**	**0**	**0**
Care Home						
TOTAL	**-6**	**-2**	**-8**	**-7**	**-14**	**-21**

EXTERNAL

Land Use	AM Peak			PM Peak		
	IN	OUT	TOT	IN	OUT	TOT
Dwellings	**55**	**152**	**208**	**136**	**77**	**214**
To Emp	*15*	*38*	*52*	*52*	*33*	*86*
To Shop	*2*	*5*	*7*	*14*	*9*	*23*
Leisure	*3*	*8*	*11*	*30*	*18*	*48*
Edu	*30*	*77*	*108*	*6*	*4*	*10*
Other	*8*	*22*	*30*	*29*	*18*	*47*
Employment	**14**	**4**	**18**	**2**	**12**	**14**
Primary Education	**0**	**0**	**0**	**0**	**0**	**0**
Secondary Education	**0**	**0**	**0**	**0**	**0**	**0**
Care Home	**0**	**0**	**0**	**0**	**0**	**0**
TOTAL	**69**	**156**	**226**	**138**	**89**	**228**

TOTAL External	0800 to 0900			1700 to 1800		
	IN	OUT	TOT	IN	OUT	TOT
Resi and Edu	55	152	208	136	77	214
Employment	14	4	18	2	12	14

0.92

With 8% discount PTP	0800 to 0900			1700 to 1800		
	IN	OUT	TOT	IN	OUT	TOT
Resi and Edu	51	140	191	125	71	196
Employment	13	4	16	2	11	13

Yate

Land Use	AM Peak			PM Peak		
	IN	OUT	TOT	IN	OUT	TOT
Dwellings	**120**	**308**	**428**	**287**	**179**	**466**
To Emp	*31*	*78*	*109*	*107*	*67*	*175*
To Shop	*5*	*12*	*17*	*35*	*22*	*57*
Leisure	*8*	*20*	*27*	*74*	*46*	*120*
Edu	*60*	*155*	*215*	*12*	*8*	*20*
Other	*17*	*43*	*60*	*58*	*36*	*94*
Employment	**93**	**26**	**119**	**15**	**80**	**94**
Primary Education	**58**	**41**	**99**	**6**	**9**	**14**
Secondary Education	**0**	**0**	**0**	**0**	**0**	**0**
Care Home	**0**	**0**	**0**	**0**	**0**	**0**
TOTAL	**271**	**375**	**646**	**307**	**267**	**574**
To Emp	*25%*	*25%*	*25%*	*37%*	*37%*	*37%*
To Shop	*4%*	*4%*	*4%*	*12%*	*12%*	*12%*
Leisure	*6%*	*6%*	*6%*	*26%*	*26%*	*26%*
Edu	*50%*	*50%*	*50%*	*4%*	*4%*	*4%*
Other	*14%*	*14%*	*14%*	*20%*	*20%*	*20%*

INTERNALISATION

Land Use	AM Peak			PM Peak		
	IN	OUT	TOT	IN	OUT	TOT
Dwellings	**-62**	**-38**	**-100**	**-20**	**-37**	**-56**
To Emp	*-3*	*-9*	*-12*	*-8*	*-1*	*-9*
To Shop	*-1*	*-2*	*-3*	*-7*	*-4*	*-11*
Leisure	*-2*	*-4*	*-5*	*-15*	*-9*	*-24*
Edu	*-33*	*-46*	*-79*	*-7*	*-5*	*-12*
Other						
Employment	**-9**	**-3**	**-12**	**-1**	**-8**	**-9**
Primary Education	**-46**	**-33**	**-79**	**-5**	**-7**	**-12**
Secondary Education				**0**	**0**	**0**
Care Home						
TOTAL	**-117**	**-73**	**-191**	**-26**	**-52**	**-77**

EXTERNAL

Land Use	AM Peak			PM Peak		
	IN	OUT	TOT	IN	OUT	TOT
Dwellings	**59**	**270**	**328**	**267**	**142**	**409**
To Emp	*28*	*69*	*97*	*100*	*66*	*165*
To Shop	*4*	*10*	*13*	*28*	*17*	*45*
Leisure	*6*	*16*	*22*	*59*	*37*	*96*
Edu	*28*	*108*	*136*	*5*	*3*	*8*
Other	*17*	*43*	*60*	*58*	*36*	*94*
Employment	**84**	**23**	**107**	**13**	**72**	**85**
Primary Education	**12**	**8**	**20**	**1**	**2**	**3**
Secondary Education	**0**	**0**	**0**	**0**	**0**	**0**
Care Home	**0**	**0**	**0**	**0**	**0**	**0**
TOTAL	**154**	**301**	**455**	**281**	**216**	**497**

TOTAL External	0800 to 0900			1700 to 1800		
	IN	OUT	TOT	IN	OUT	TOT
Resi and Edu	70	278	348	268	144	412
Employment	84	23	107	13	72	85

0.92

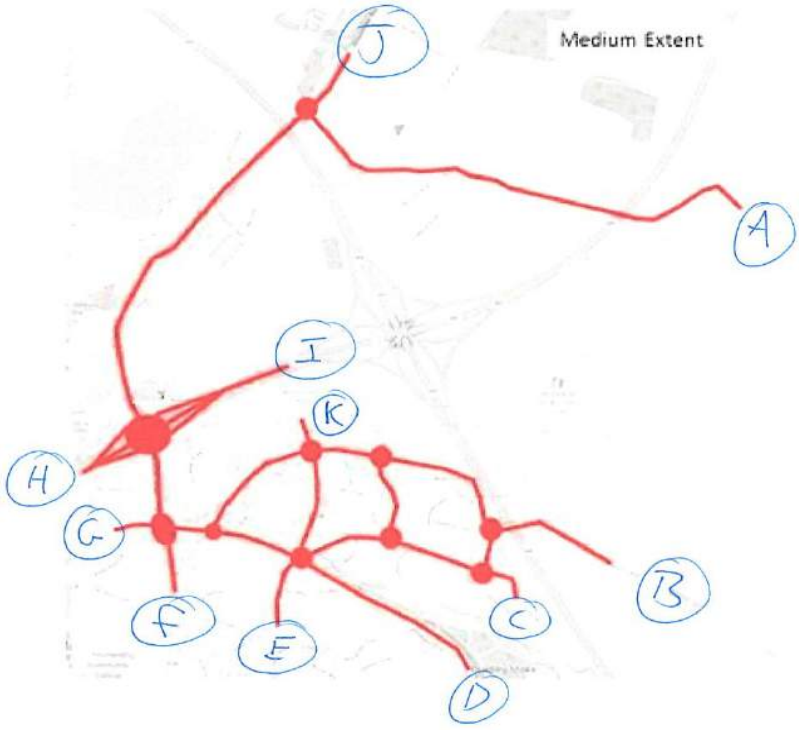
With 8% discount PTP	0800 to 0900			1700 to 1800		
	IN	OUT	TOT	IN	OUT	TOT
Resi and Edu	65	256	320	247	132	379
Employment	77	21	98	12	66	78

APPENDIX C: DISTRIBUTION

Charfield Distribution

Resi		From	
	To	I	
	A	0	0%
	B	0	0%
	C	0	0%
	D	12	0%
	E	8	0%
	F	93	4%
	G	54	2%
	I	0	0%
	J	0	0%
	K	36	1%
		2541	

Employ		To	
	From	I	
	A	0	0%
	B	0	0%
	C	0	0%
	D	6	0%
	E	3	0%
	F	468	13%
	G	5	0%
	H	1023	29%
	I	0	0%
	J	0	0%
	K	2	0%
		3573	



Resi		To										
		A	B	C	D	E	F	G	H	I	J	K
From	A									0%		
	B									0%		
	C									0%		
	D									0%		
	E									0%		
	F									4%		
	G									2%		
	H									8%		
	I		0%	0%	0%	0%	4%	2%	8%	0%	0%	1%
	J									0%		
	K									1%		

Employ		To										
		A	B	C	D	E	F	G	H	I	J	K
From	A									0%		
	B									0%		
	C									0%		
	D									0%		
	E									0%		
	F									13%		
	G									0%		
	H									29%		
	I		0%	0%	0%	0%	13%	0%	29%	0%		
	J									0%		
	K									0%		

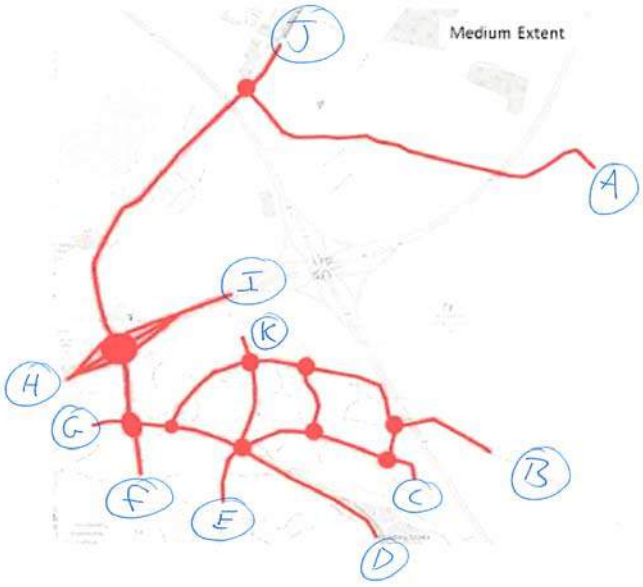
Coal Pit Heath Distribution

Resi

To		J	From A	B	D	I	
A	0	0%					
B	0	0%					
C	0	0%					
D	0	0%					
E	0	0%					
F	0	0%					
G	179	5%			2%	2%	
H	349	9%					9%
I	0	0%					
J	0	0%					
K	110	3%			3%		
	3840						

Employ

from		J	TO A	B	D	I	
A	0	0%					
B	0	0%					
C	0	0%					
D	0	0%					
E	0	0%					
F	0	0%					
G	5	0%			0%		
H	106	7%					7%
I	0	0%					
J	0	0%					
K	2	0%			0%		



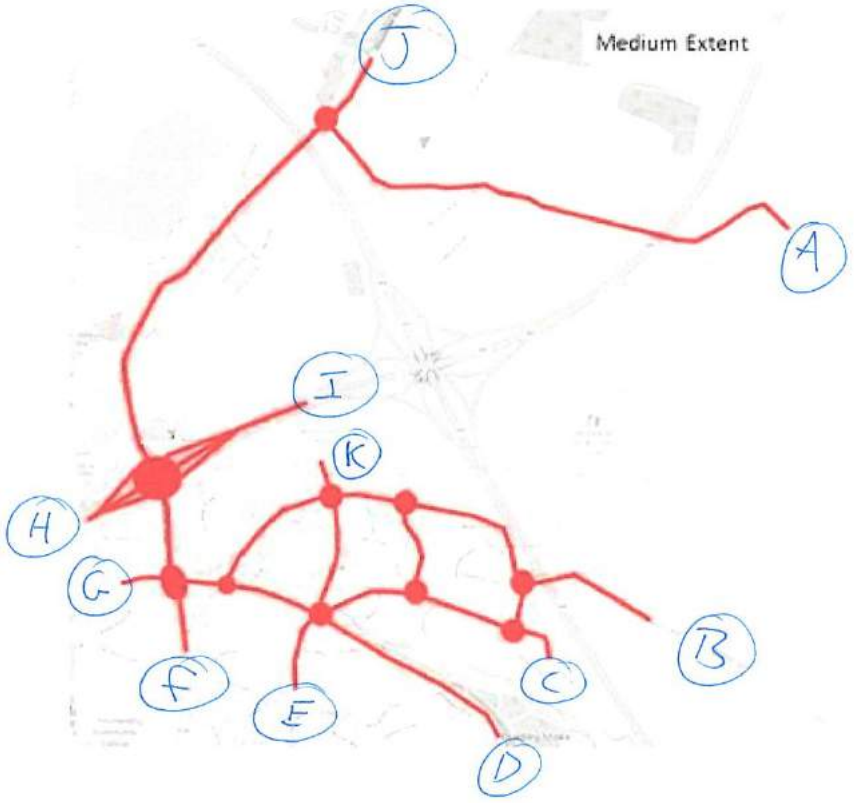
Resi	To											
		A	B	C	D	E	F	G	H	I	J	K
From	A											
	B							2%				3%
	C											
	D							2%				
	E											
	F											
	G		2%		2%							
	H									9%		
	I								9%			
	J											
	K		3%									

Employ	To											
		A	B	C	D	E	F	G	H	I	J	K
From	A											
	B							0%				0%
	C											
	D							0%				
	E											
	F											
	G		0%		0%							
	H									7%		
	I								7%			
	J											
	K		0%									

Thornbury Distribution

Resi	(ENTERI
A	0%
B	0%
C	0%
D	1%
E	0%
F	5%
G	3%
H	12%
I	26%
J	0%
K	2%

Employ	From J
A	0%
B	0%
C	0%
D	2%
E	0%
F	4%
G	2%
H	11%
I	20%
J	0%
K	3%

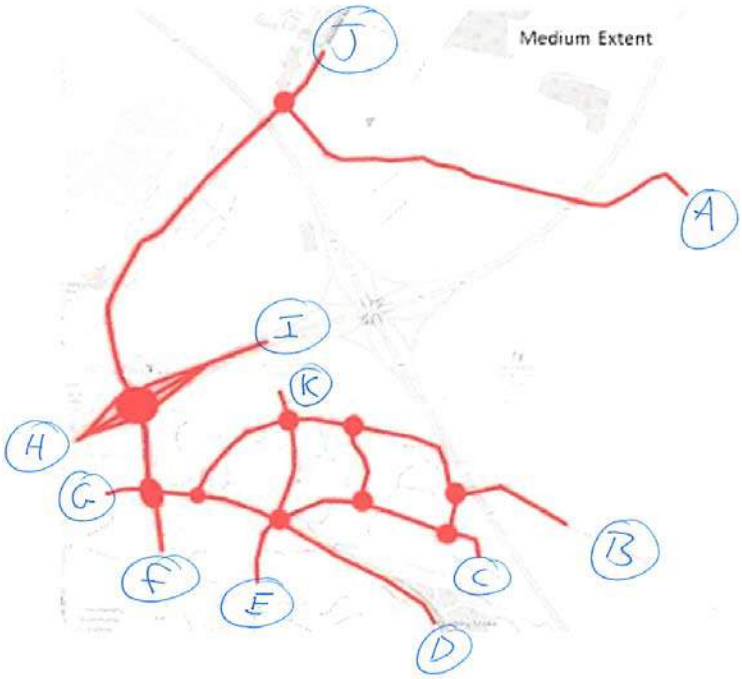


Resi	To											
		A	B	C	D	E	F	G	H	I	J	K
From	A										0%	
	B										0%	
	C										0%	
	D										1%	
	E										0%	
	F										5%	
	G										3%	
	H										12%	
	I										26%	
	J	0%	0%	0%	1%	0%	5%	3%	12%	26%	0%	2%
	K										2%	

Resi	To											
		A	B	C	D	E	F	G	H	I	J	K
From	A										0%	
	B										0%	
	C										0%	
	D										2%	
	E										0%	
	F										4%	
	G										2%	
	H										11%	
	I										20%	
	J	0%	0%	0%	2%	0%	4%	2%	11%	20%	0%	3%
	K										3%	

Yate Distribution

Resi			From		
To		J	A	B	D
A	0	0%			
B	0	0%			
C	0	0%			
D	54	0%			0%
E	19	0%			0%
F	379	3%			3%
G	342	3%			3%
H	765	7%	7%		
I	0	0%			
J	0	0%			
K	253	2%			2%
	10987				
Employment			To		
From		J	A	B	
A	0	0			
B	0	0			
C	0	0			
D	7	0%			0%
E	4	0%			0%
F	1054	19%			19%
G	7	0%			0%
H	734	13%	13%		
I	0	0%			
J	0	0%			
K	3	0%			0%
	5481				



Resi	TO											
		A	B	C	D	E	F	G	H	I	J	K
FROM	A											
	B				0%	0%	3%	3%				2%
	C											
	D		0%					0%				
	E		0%									
	F		3%									
	G		3%		0%							
	H											
	I								0%			
	J								7%			
	K		2%									

Employ	To											
		A	B	C	D	E	F	G	H	I	J	K
FROM	A											
	B				0%	0%	19%	0%				0%
	C											
	D		0%					0%				
	E		0%									
	F		19%									
	G		0%		0%							
	H									0%	13%	
	I								0%			
	J								13%			
	K		0%									

APPENDIX D: MODEL OUTPUTS AND LMVR

vectos
microsimulation specialists

Woodlands Bristol VISSIM Model
Local Model Validation Report

July 2017

Cornwall Buildings, 45 Newhall Street, Birmingham B3 3QR www.vectos.co.uk
Registered address: Vectos Microsim Limited, 82 St John Street, London EC1M 4JN Company no. 9322829

Contents

1 INTRODUCTION 1

Background 1
Scope 1
Report Structure 3

2 MODEL SPECIFICATION & SURVEY DATA 4

Manual Classified Counts (MCC) 5
Automatic Traffic Counts (ATCs) 5
Journey Times 7
Video Footage 8

3 BASE MODEL DEVELOPMENT 9

Network Structure 9
Time Periods 10
Vehicle Speeds 10
Priority Rules & Conflict Areas 10
Signalised Junctions 11
Public Transport 11
Matrix Estimation 12
M5 Mainline Flows 14

4 MODEL CALIBRATION 16

Calibration Criteria 16
Turn and Link Count Calibration 17

5 MODEL VALIDATION 19

Link Validation 19
Journey Time Analysis 20

6 SUMMARY AND CONCLUSIONS 21

Figures

Figure 1: Model Extent 2
Figure 2: MCC and ATC Survey Locations 6
Figure 3: Surveyed Journey Time Routes 7
Figure 4: Network Extent 9
Figure 5: MIDAS Loop Locations 15

Tables

Table 1: Zone Numbers and Locations 13
Table 2: MIDAS Loop I.Ds 14
Table 3: Calibration Statistics Summary 18
Table 4: Link Validation Statistics Summary 19
Table 5. AM & PM Journey Time Validation Results 20

Appendices

Appendix A: Full Calibration & Validation Results

1 INTRODUCTION

Background

1.1 Vectos Microsim (VM) has been appointed by Vectos South (VS) to develop a new 2017 VISSIM Base model of M5 Junction 16 and the surrounding network which can be subsequently used to undertake development impact assessments in the locality.

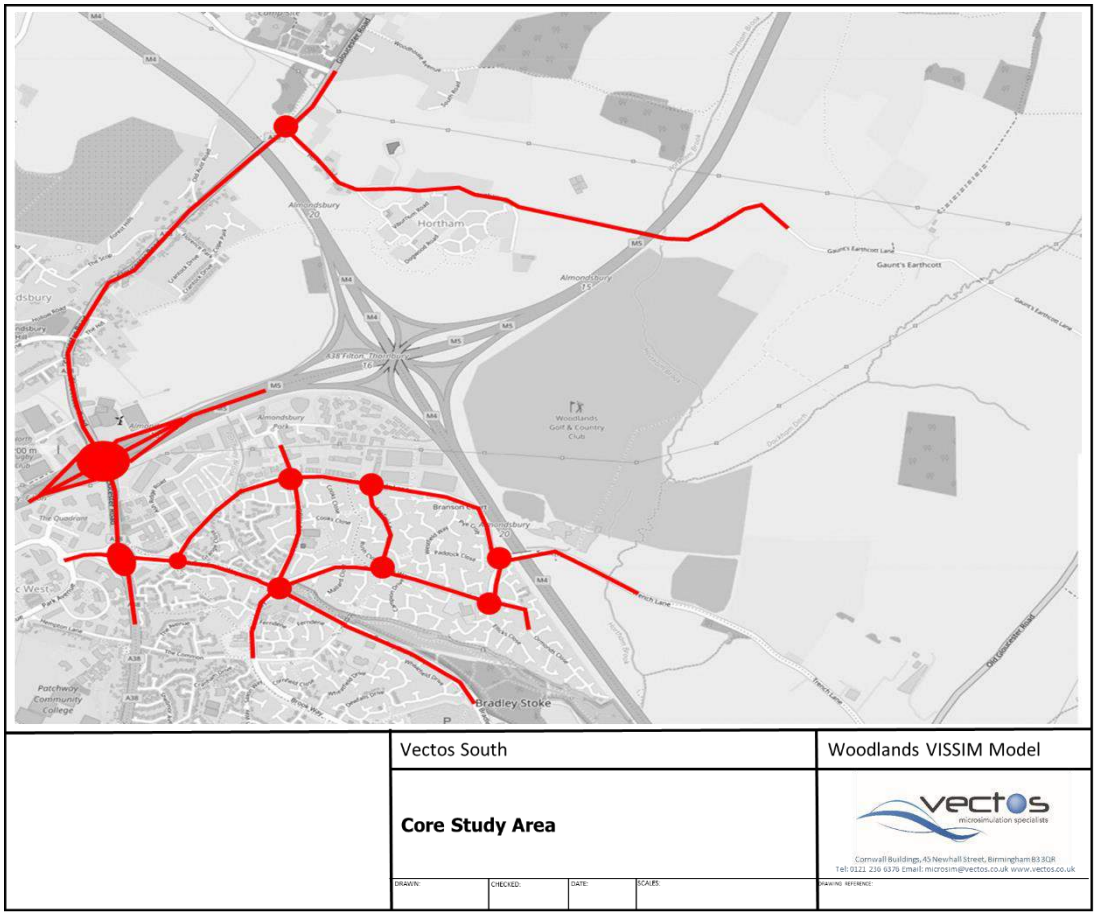
1.2 This report summarises the steps taken to develop the Base model and presents an assessment of the respective model calibration and validation in line with the study brief.

Scope

1.3 The model has been created using VISSIM version 9.00-07, and developed afresh using OS data provided by VS, and the background Bing maps add-on in VISSIM. The model includes M5 J16 and the Aztec West Roundabout just to the south as its central focal point, extending northwards to the A38 Gloucester Road/Hortham Lane junction and eastwards to Trench Lane.

1.4 The core study area of the model is illustrated in Figure 1 below:

Figure 1: Model Extent



Report Structure

1.5 The remainder of the report is set out as follows:

- Chapter 2 – Summarises the general model settings used in the resulting model, the assessment criteria adhered to in its development, and the observed data that was available and used in the model's development
- Chapter 3 – Summarises the VISSIM parameters used in model development, and the process of updating the previous 2008 Base to present day conditions
- Chapter 4 – Presents the model calibration assessments
- Chapter 5 – Presents the model validation assessments
- Chapter 6 – Provides a summary and the conclusions

2 MODEL SPECIFICATION & SURVEY DATA

2.1 The model has been developed and validated with the following specifications:

- **VISSIM Version**:
  - 9.00-07
- **Base Year**:
  - 2017
- **Simulation Periods (Evaluation Periods):**
  - AM: 07:30-09:30 (08:00-09:00)
  - PM: 16:30-18:30 (17:00-18:00)
- **Assignment Method:**
  - Dynamic Assignment
- **Assessment Criteria**
  - Network calibration assessed against observed 2017 Manual Classified Turn Counts (MCCs) at 10 junctions, and supporting video footage
  - Model validation assessed against 2017 ATC Link Count data at 6 bi-directional sites, and Journey Times surveys comprising 4 complete routes

2.2 The following data has been utilised in the development of the 2017 Base model.

Manual Classified Counts (MCC)

2.3 MCCs were undertaken by the survey company MHC Traffic Limited on Tuesday 13th June 2017 at the following locations:

- M5 East/A38 Gloucester
- A38 Gloucester Road/Bradley Stoke Way/Park Avenue
- Bradley Stoke Way/Pear Tree Road/Bowsland Way/Brook Way
- A38 Gloucester Road/Hortham Lane
- Bradley Stoke Way/Woodlands Lane
- Woodlands Lane/Great Park Road/Pear Tree Road
- Woodlands Lane/Foxfield Avenue
- Foxfield Avenue/Bowsland Way
- Trench Lane/Ormonds Close/Ellicks Close/Bowsland Way
- Woodlands Lane/Trench Lane

2.4 Data for all MCC site locations was collected at 15-minute intervals and disaggregated by vehicle type.

2.5 When processed these junction surveys equated to a total of 122 turning movements for each modelled peak hour. These turning movements were used to assess the relationship between modelled and observed flows during model calibration.

Automatic Traffic Counts (ATCs)

2.6 To supplement the MCCs, ATCs were also commissioned to ensure that the MCC counts taken on a single day were representative of flows across an extended weekly period. ATC data provides an independent check of the validity of the MCC counts.

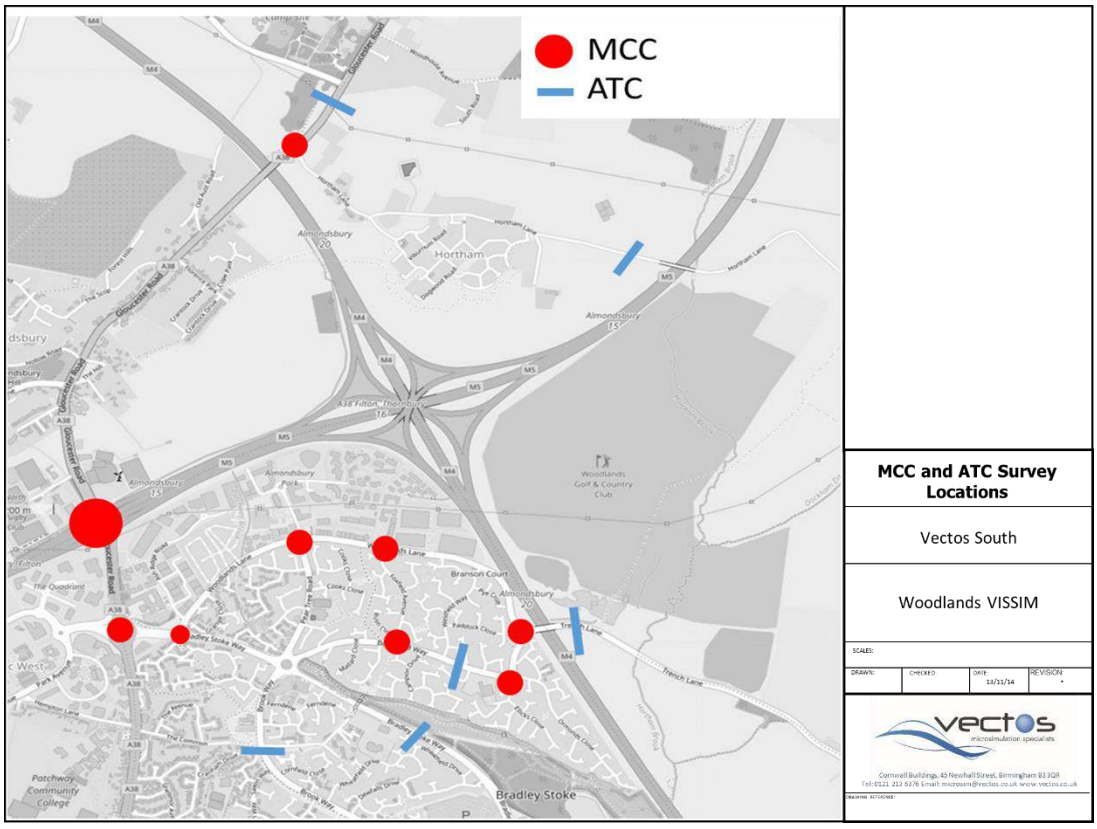
2.7 6 ATC sites were selected and surveyed by MHC Traffic across various different days in June, providing at least one week of data with which to derive average weekday traffic flows.

2.8 These sites are listed below:

- A38 Gloucester Road North
- Hortham Lane
- Trench Lane
- Bowsland Way
- Bradley Stoke Way
- Brook Way

2.9 The following figure presents the location of all MCC junction and ATC link counts:

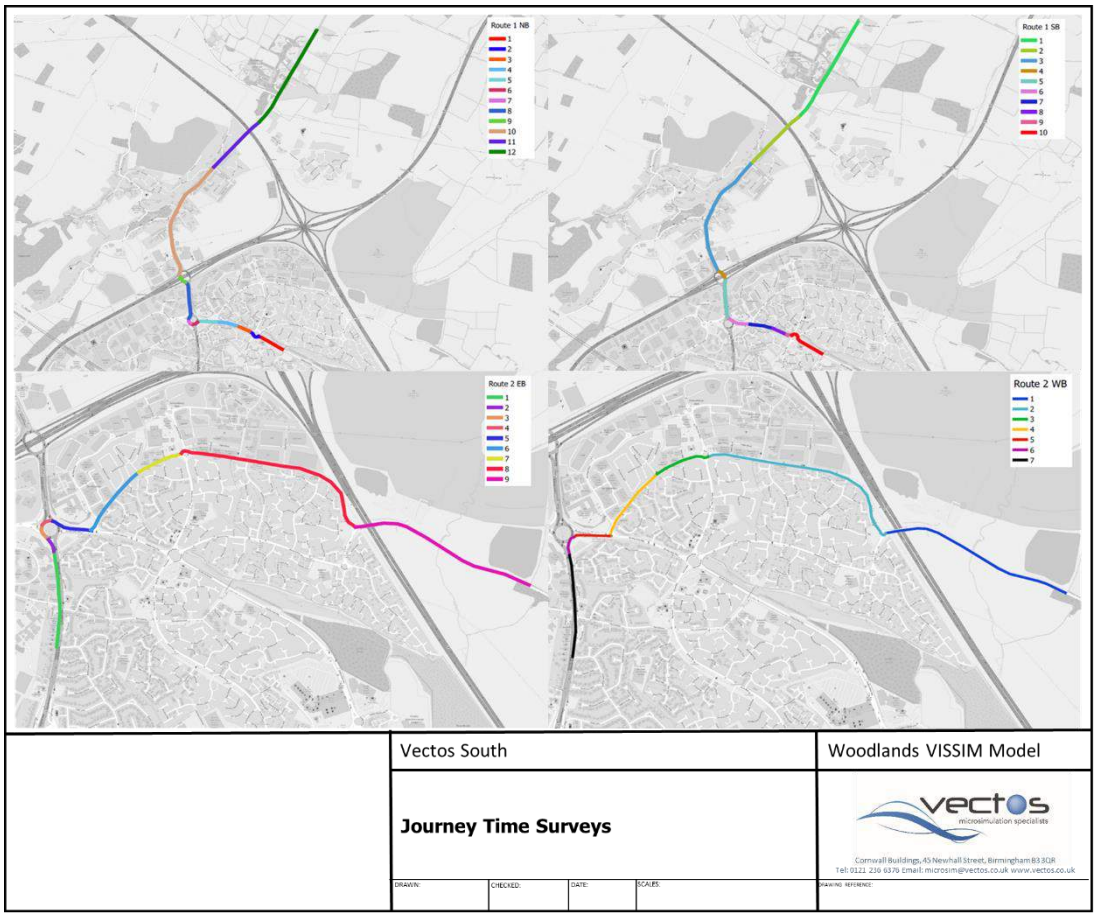
Figure 2: MCC and ATC Survey Locations



Journey Times

2.10 2017 Journey Times were also carried out by MHC Traffic Limited along 2 separate bi-directional routes, resulting in four complete journey time paths as illustrated in the Figure below:

Figure 3: Surveyed Journey Time Routes



2.11 Each of these routes is further sub-divided into sections, as shown in the image. The routes extend across the following:

- Route 1 Northbound: Bradley Stoke Way to A38 Gloucester Road North, via Aztec West Roundabout, M5 J16 and the Hortham Lane junction
- Route 1 Southbound: as above, in the reverse direction
- Route 2 Eastbound: A38 Gloucester Road South to Trench Lane, via Aztec West Roundabout and Woodlands Lane
- Route 2 Westbound: as above, in the reverse direction

Video Footage

2.12 Video surveys were also carried out at three primary junctions within the study area:

- M5 J16
- Aztec West Roundabout
- Bradley Stoke Way/Pear Tree Road/Bowsland Way/Brook Way

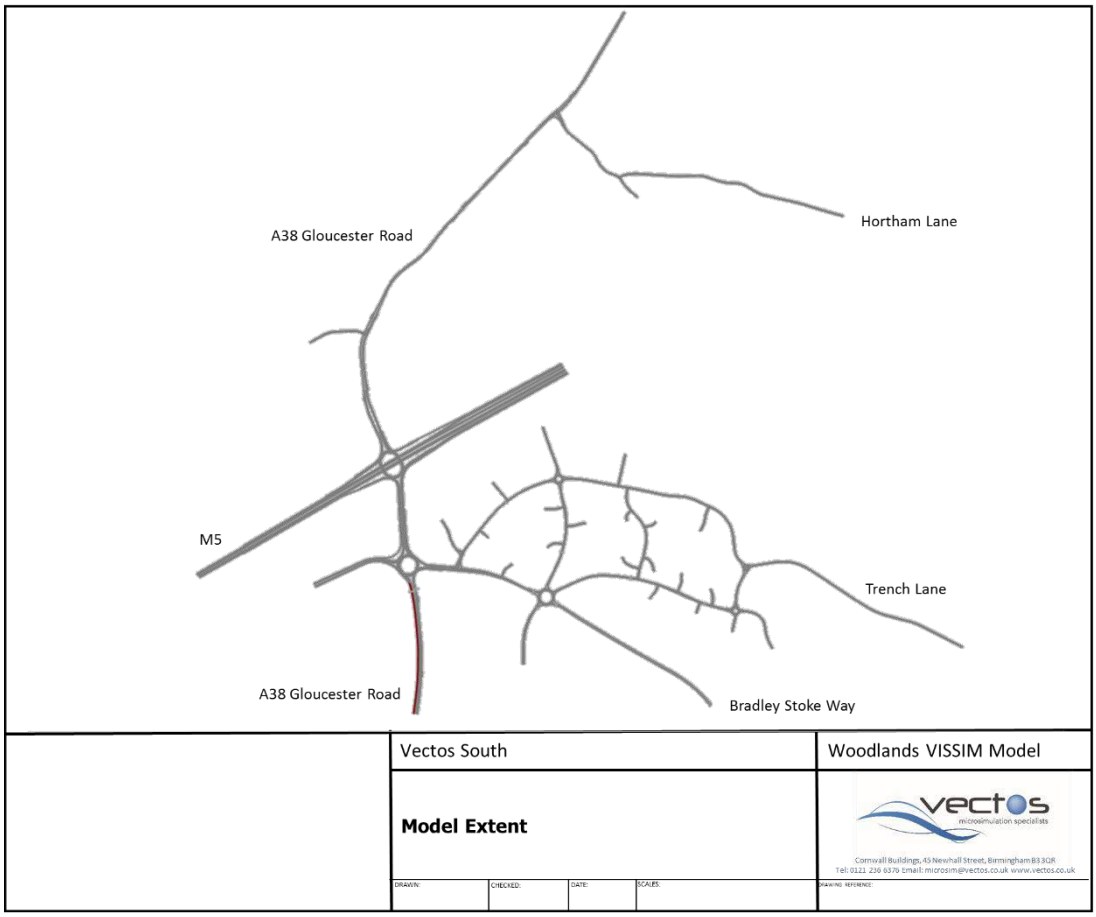
2.13 This footage was consulted during development of the Base model to ensure queue profiles and network geometry were representative of on street conditions.

3 BASE MODEL DEVELOPMENT

Network Structure

3.1 The general network extent is presented in Figure 6 below:

Figure 4: Network Extent



3.2 VM is aware that during the data collection period, roadworks were present at and around Aztec West Roundabout. For the purposes of base model development, and to ensure connection with survey data is maintained, the network was coded as per the network operation at the time the surveys were collected. It is accepted that this is likely to be different to the pre and post-roadworks network operation, but it does provide an accurate representation of the network through which the surveyed data has been obtained.

3.3 Should the Base model be used for model forecasting, the network should be reviewed in line with the expected alignment at the time of the forecast year and, if necessary, adjustments should be made to traffic demands to account for the constrained throughput resulting from the roadworks at the time the base model was developed.

Time Periods

3.4 The VISSIM model has been developed for AM and PM peak hours, with a 30 minute warm up and cool down period included before and after the peak. These peak hours were determined through analysis of the observed turn count data across the 3 hours provided for each peak period.

3.5 The model has been developed using 15-minute matrices to cover the entire model period. Each 15-minute time interval, for warm-up, peak and cool-down, includes a matrix for Light vehicles and a matrix for Heavies, informed mainly by the MCC survey counts. The process of matrix development is discussed in more detail in the *Matrix Estimation* section.

Vehicle Speeds

3.6 Desired speed decisions have been included at locations in the network where speed limit changes are enforced. The speed distribution curves that provide the range of speeds permitted for vehicles to travel within each speed limit bracket have been calculated through interrogation of DfT statistics of Free Flow Vehicle Speeds[1]. Speeds are applied on the basis of vehicle class (i.e. Heavy vehicles are subject to lower speed controls than Lights).

3.7 Other areas in the network, where localised speed changes are necessary (i.e. where curves in road geometry/approaches to junctions would require vehicles to reduce speeds), are controlled by reduced speed areas, which temporarily reduce a vehicle's desired speed. Again the distribution curves that inform these speeds are calculated by DfT statistics, and the speeds included are 1) based on sensible estimations of a vehicle's speed on a particular area of the network, and 2) used as a calibration tool to ensure realistic throughput at junction approaches, as noted in MCC counts and video footage, is reflected within the model.

Priority Rules & Conflict Areas

3.8 Priority Rules and/or Conflict Areas have been included at all give-way junctions and priority controlled roundabouts to ensure vehicle movements through and around junctions are realistic and that 'vehicle crossover' in the model is limited.

[1] Dft, *Vehicle free flow speeds by road type and vehicle type in Great Britain: 2015,* June 2016, Table SPE0111

3.9 Priority rules were also added at specific locations to represent yellow boxes and courtesy let-in behaviour. This enables the model to accurately reflect on-street driving etiquette at heavily-congested locations where vehicles will often allow space in front to prevent blocking a junction, whilst also helping to minimise the possibility of the network locking up.

Signalised Junctions

3.10 The model extent includes five signalised junctions:

- M5 J16
- Aztec West Roundabout
- Bradley Stoke Way/Woodlands Lane
- A38 Gloucester Road/Hortham Lane
- Bradley Stoke Way/Orchard Gate

3.11 For the first three junctions, LinSig models provided the necessary intergreens and signal staging. Green times for each phase within a junction were adjusted as part of the model calibration process; video footage shows that on-street, green times for these signals are reactive to demand and so LinSig times should not be applied too rigidly.

3.12 The A38 Gloucester Road/Hortham Lane junction signal times were informed by video footage, which provided the staging of the junction. Again on street this junction operates on variable demand times but for the purposes of the VISSIM model, fixed time signals were included using average green times across the junction. For the final junction, a realistic signal plan was devised by VM to replicate the operation on street.

Public Transport

3.13 A review of public transport provision across the network was carried out to ensure all bus routes were represented within the modelling. The following bus routes are all represented in the model:

- 77
- 78/79
- S7C
- 73
- 963

3.14 Online timetables were used to identify predominant bus routes through the network, and to generate start times for these routes. These were then cross-checked with bus turn counts recorded in the classified turn counts and timetables were adjusted accordingly.

Matrix Estimation

3.15 MCC data formed the basis for the matrix estimation process, as these provide the counts that need to be matched in the model in order to achieve model calibration. As VISSIM does not include a built-in matrix estimation module that can be used to automatically calculate matrices based on desired link and/or turn counts, this was carried out through spreadsheet calculations which involved a series of processes designed to create realistic O-D patterns using only junction turn count data and land use observations.

3.16 Firstly, MCC data was processed to give 15-minute counts for all junctions. Many of these surveys are located at the edge of the model extent, meaning that certain O-D movements are known (as the origin and destination zones are both external to the network). These counts were maintained through the matrix estimation process.

3.17 All remaining O-D movements were calculated proportionally based on successive turning movement proportions, meaning that a total count from a particular zone is distributed across all remaining zones in the network. Due to the route choice within the model, the shortest route was assumed as the contributor to each O-D movement.

3.18 As there are multiple route possibilities through the network, and trips may start and/or end at other areas within the network that have not been surveyed, additional zones were added into the network to produce and attract trips elsewhere in the network.

3.19 The total list of zones included in the network is as follows:

Table 1: Zone Numbers and Locations

Zone Number	Location	Surveyed?
1	A38 Gloucester Road (East)	Yes
2	Hortham Lane	Yes
3	M5 (East)	Yes
4	M5 (West)	Yes
5	Park Avenue	Yes
6	A38 Gloucester Road (South)	Yes
7	Brook Way	Yes
8	Bradley Stoke Way (East)	Yes
9	Great Park Road	Yes
10	Ellicks Close	Yes
11	Ormonds Close	Yes
12	Trench Lane (East)	Yes
13	Over Lane	No
14	Woodlands Park	No
15	Orchard Gate	No
16	Ottrells Mead/Cooks Close/Apseleys Mead	No
17	Badgers Close/Warren Close/Foxborough	No
18	Business Park	No
19	Westfield Way North	No
20	Westfield Way South	No
22	Hickory Lane	No

3.20 Total vehicle numbers beginning or ending their trip at an un-surveyed zone were informed by a) the land use and estimated trip numbers associated to that zone, and b) known in/out trips necessary to make up any shortfall or reduce trip numbers between upstream and downstream junctions, identified through the development of an hourly schematic diagram of the network.

3.21 For example, A38 Gloucester Road/Hortham Lane junction and M5 J16 were both surveyed. It is therefore known the southbound A38 movements from the Hortham Lane junction, and the southbound A38 movements approaching the M5 J16 junction. Any difference between these values will be the result of the un-surveyed junctions in-between, either removing or adding trips to the link. In this case, the assumed largest contributor to this (Over Lane) was coded into the model (Zone number 13) and realistic in/out trip numbers were included to assist the calibration of both Hortham Lane and M5 J16 junctions.

3.22 Large residential areas in the middle of the network (between Woodlands Lane and Bradley Stoke Way/Bowsland Way) were also included to ensure a more realistic model operation, ensuring trips passing through Pear Tree Road and Foxfield Avenue were not only external through trups, but also trips originating at the surrounding residential streets.

3.23 Employment centres at the west (off Ash Ridge Road) and the north of Woodlands Lane were also included.

3.24 Distribution for these un-surveyed zones were informed using the same process of proportional turn counts, ensuring that all resulting O-D movements were realistic (i.e. residential to residential and employment to employment trips were restricted to prevent artificial 'trip-dumping').

3.25 The final stage of the matrix estimation process involved the application of some global factors to account for some trips getting lost in the turn count proportion methodology (because of the numerous routes open to vehicles), and some manual adjustments of specific O-D absolute values where considered necessary to meet turn count calibration targets.

M5 Mainline Flows

3.26 MCC counts provided the numbers of vehicles on the M5 on and off-slips at Junction 16, but not the mainline flows passing through the junction. To inform these flows, Highways England (HE) online database WebTRIS was explored.

3.27 The database holds 15-minute vehicular flows for various locations between January 2017-April 2017. These were processed to filter out weekend results to provide average 15-minute flows for both AM and PM peak hours at the following three locations:

Table 2: MIDAS Loop I.Ds

Number	Location	MIDAS Loop I.D.	Grid Reference
1	**Northbound within M5 J16**	M5/8325B	360475 , 183183
2	**Northbound (continuing)**	M5/8315B	361376 , 183646
3	**Southbound within M5 J16**	M5/8324A	360566 , 183214

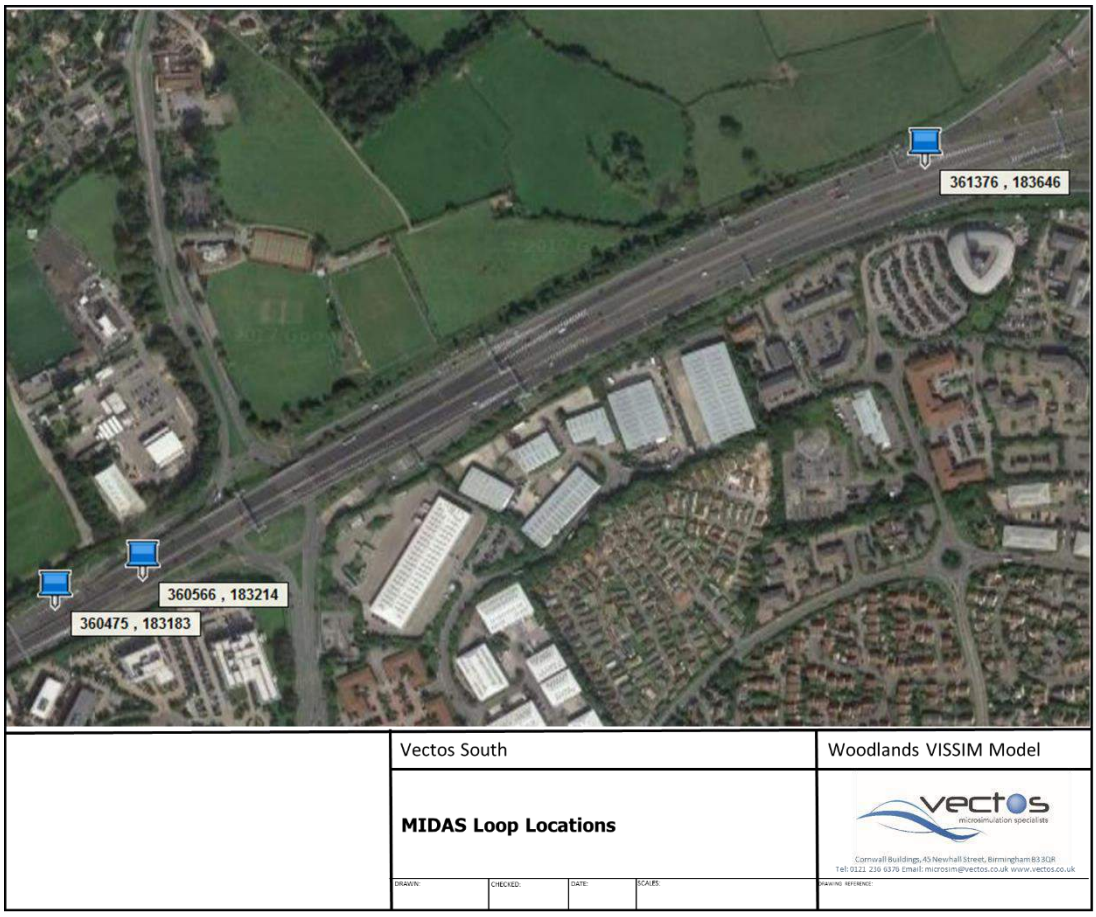
1. Northbound within M5 J16 – this provided the total vehicle numbers passing through the junction. This, plus the total vehicle numbers on M5 J16 eastbound off-slip as informed by the MCC, equals the originating zone total for M5 West zone (no.4)

2. Northbound (continuing) – this provided the total trip numbers continuing through both J15 and J16 on M5 mainline (i.e. not using the northbound distributor that allows vehicles to exit the mainline at J16). In turn, this provided the vehicle numbers that *do* use the distributor (by subtracting this value from Loop I.D. 8325B).

3. Southbound within M5 J16 – this provided the total vehicle numbers passing through the junction in a southbound direction.

3.28 The MIDAS loops used are shown in the Figure below:

Figure 5: MIDAS Loop Locations



4 MODEL CALIBRATION

Calibration Criteria

4.1 Flow calibration is a process whereby modelled flow outputs are compared to the equivalent observed traffic flows across the network.

4.2 The Geoffrey E. Havers (GEH) statistic is a standard way of comparing the observed and modelled flows, as defined in DMRB, Volume 12, Chapter 4. The GEH value is similar to a chi-squared test and also incorporates both relative and absolute errors in order to give an overall measure of the accuracy of the modelled flow.

4.3 The GEH statistic has the benefit of removing bias that exists when comparing flows of different magnitudes using percentages, such that a difference of 10 in a flow of 100 vehicles per hour (vph) is less significant (GEH = 1) than a difference of 100 in a flow of 1000 vph (GEH = 3.2).

4.4 The GEH statistic is calculated by:

$$GEH = \sqrt{\frac{(M-C)^2}{(M+C)/2}}$$

where:

GEH = GEH statistic

M = Modelled flow

C = Observed flow

4.5 Dft guidance indicates that the GEH statistics should be less than 5.0 for 85% of comparisons between observed and modelled hourly flows.

4.6 Furthermore, the difference between observed and modelled link flows is also examined. DfT provides guidance for acceptable absolute or percentage differences in observed vehicles per hour (vph) in DMRB as follows:

- For observed flows < 700 vph, modelled flow within 100 vph of observed flow
- For observed flows 700-2,700 vph, modelled flow within 15% of observed flow
- For observed flows > 2,700 vph, modelled flow within 400 vph of observed flow

4.7 Again, 85% of hourly flows should be within this criteria.

Turn and Link Count Calibration

4.8 10 MCC sites were used to inform the development of the demand matrices and are therefore used to inform calibration of the network. This provided a total calibration target of 122 counts.

4.9 The full set of AM and PM turn and link count calibration results can be found in Appendix A.

4.10 A summary of the calibration results for all peak periods and for all datasets is provided in the table overleaf:

Table 3: Calibration Statistics Summary

Turn Count Calibration (GEH)				
	AM		PM	
Counts	122		301	
	Pass	%	Pass	%
<3	102	83.6%	101	82.8%
<4	113	92.6%	114	93.4%
<5	118	96.7%	119	97.5%
<6	121	99.2%	122	100.0%
<7	121	99.2%	122	100.0%
<8	121	99.2%	122	100.0%
<9	122	100.0%	122	100.0%
Link Flow Calibration				
	AM		PM	
Counts	72		72	
<700 veh	*within 100*		*within 100*	
pass	47	100.0%	49	100.0%
fail	0	0.0%	0	0.0%
700-2700	*<15%*		*<15%*	
pass	23	100.0%	23	100.0%
fail	0	0.0%	0	0.0%
>2700 vehs	*within 400*		*within 400*	
pass	2	-	0	-
fail	0	-	0	-
TOTAL				
pass	72	100.0%	72	100.0%
fail	0	0.0%	0	0.0%
Summary				
	AM		PM	
Turn GEH<5	96.7%		97.5%	
Link Flow	100.0%		100.0%	

4.11 The results show that both AM and PM models surpass DMRB standards in regards to turn and link flow calibration. These measures combined demonstrate that the model is accurately representing turn movements at each junction, and link flows on approaches and exits to these junctions.

5 MODEL VALIDATION

Link Validation

5.1 As described in Chapter 2, a number of sites were available for which link count data could be used for the purposes of validation. As these datasets were not used during the matrix development process they can be used to provide an independent check of modelled flows.

5.2 The table below provides a summary of AM and PM peak hour link flow validation statistics:

Table 4: Link Validation Statistics Summary

Link Validation (GEH)				
	AM		PM	
Counts	**12**		**12**	
	Pass	**%**	**Pass**	**%**
<3	8	66.7%	9	75.0%
<4	10	83.3%	12	100.0%
<5	12	100.0%	12	100.0%
<6	12	100.0%	12	100.0%
<7	12	100.0%	12	100.0%
<8	12	100.0%	12	100.0%
<9	12	100.0%	12	100.0%
<10	12	100.0%	12	100.0%
Link Flow Validation				
	AM		**PM**	
<700 veh	*within 100*		*within 100*	
pass	10	100.0%	9	100.0%
fail	0	0.0%	0	0.0%
700-2700	*<15%*		*<15%*	
pass	2	100.0%	3	100.0%
fail	0	0.0%	0	0.0%
>2700 vehs	*within 400*		*within 400*	
pass	0	-	0	-
fail	0	-	0	-
TOTAL				
pass	12	100.0%	12	100.0%
fail	0	0.0%	0	0.0%
Summary				
	AM		**PM**	
GEH<5	100.0%		100.0%	
Flow	100.0%		100.0%	

5.3 Both AM and PM link validation results show that 100% of the 12 link counts (6 locations, 2 directions) exhibit a GEH of less than 5 and meet DfT's link flow criteria. As a result both models can be considered to be well validated to observed link flows.

Journey Time Analysis

5.4 As identified in Chapter 2, journey time surveys were carried out along four separate routes. TAG Unit M3.1 outlines that for 85% of the modelled routes, the difference between the observed and modelled journey times should not be more than 15% (or 1 minute, if higher).

5.5 The table below details the AM and PM journey time results for each journey time section:

Table 5. AM & PM Journey Time Validation Results

		AM				PM			
I.D	**Description**	**Obs.**	**Mod.**	**Diff**	**Pass?**	**Obs.**	**Mod.**	**Diff**	**Pass?**
Route 1 NB	Bradley Stoke Way to A38 Gloucester Road North	485	496	11	Pass	421	473	52	Pass
Route 1 SB	A38 Gloucester Road North to Bradley Stoke Way	494	534	39	Pass	458	437	21	Pass
Route 2 EB	A38 Gloucester Road South to Trench Lane	354	409	55	Pass	364	371	6	Pass
Route 2 WB	Trench Lane to A38 Gloucester Road South	396	377	19	Pass	471	402	69	Pass

5.6 The results above show that in both AM and PM models, 100% of the journey time sections validate to within TAG criteria highlighted above.

5.7 Each full route presented above is broken down further into journey time sections (as detailed in Figure 3). Full results for each section can be found in Appendix A. Results show that based on DMRB criteria, all individual sections also adhere to standards).

6 SUMMARY AND CONCLUSIONS

6.1 Vectos Microsim (VM) has been appointed by Vectos South (VS) to create a new 2017 VISSIM Base model of M5 J16 and the surrounding network in order to provide the foundation for development testing in the area.

6.2 The model has been developed using VISSIM version 9.00-07, and includes M5 J16, Aztec West Roundabout at the centre, stretching westwards to Bradley Stoke Way, Woodlands Lane and Trench Lane and northwards to the junction between A38 Gloucester Road and Hortham Lane.

6.3 The model has drawn upon a large pool of observed data including MCC turn counts, ATC link counts, surveyed journey time data and video footage.

6.4 The results presented in this document demonstrate that the modelled outputs correlate closely with all of the above datasets and as a result, all models can be considered to be robust tools with which to test any future year scheme appraisal or development impact assessment.

Appendix A

Junction No.	Junction Description	From Arm	To Arm	08:00-09:00									08:00-09:00				
				Observed			Modelled			GEH			TOTAL VEHICLES SUMMARY				
				Lights	Heavies	Buses	Lights	Heavies	Buses	Lights	Heavies	Buses	Observed	Modelled	Difference	%	GEH
Site 1	M5 East / A38 Gloucester	M5 (East)	A38 Gloucester Road (South)	1808	29	3	1734	35	0	1.8	1.1	2.4	1840	1769	-71	4%	1.7
Site 1	M5 East / A38 Gloucester	M5 (East)	M5 (West)	3	0	0	0	0	0	2.4	0.0	0.0	3	0	-3	100%	2.4
Site 1	M5 East / A38 Gloucester	M5 (East)	A38 Gloucester Road (North)	218	14	0	227	6	0	0.6	2.5	0.0	232	233	1	0%	0.1
Site 1	M5 East / A38 Gloucester	M5 (East)	M5 (East)	2	0	0	2	0	0	0.0	0.0	0.0	2	2	0	0%	0.0
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	M5 (West)	336	9	3	367	10	0	1.7	0.3	2.4	348	377	29	8%	1.5
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	A38 Gloucester Road (North)	363	4	14	366	8	16	0.2	1.6	0.5	381	390	9	2%	0.5
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	M5 (East)	431	23	4	452	14	0	1.0	2.1	2.8	458	466	8	2%	0.4
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	A38 Gloucester Road (South)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 1	M5 East / A38 Gloucester	M5 (West)	A38 Gloucester Road (North)	323	12	0	321	10	0	0.1	0.6	0.0	335	331	-4	1%	0.2
Site 1	M5 East / A38 Gloucester	M5 (West)	M5 (East)	18	0	0	0	0	0	6.0	0.0	0.0	18	0	-18	100%	6.0
Site 1	M5 East / A38 Gloucester	M5 (West)	A38 Gloucester Road (South)	821	14	0	772	19	0	1.7	1.2	0.0	835	791	-44	5%	1.5
Site 1	M5 East / A38 Gloucester	M5 (West)	M5 (West)	3	0	0	0	0	0	2.4	0.0	0.0	3	0	-3	100%	2.4
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	M5 (East)	201	10	0	191	15	0	0.7	1.4	0.0	211	206	-5	2%	0.3
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	A38 Gloucester Road (South)	546	4	11	514	12	11	1.4	2.8	0.0	561	537	-24	4%	1.0
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	M5 (West)	332	27	0	305	23	0	1.5	0.8	0.0	359	328	-31	9%	1.7
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	A38 Gloucester Road (North)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	A38 Gloucester Road (South)	231	4	7	228	1	3	0.2	1.9	1.8	242	232	-10	4%	0.6
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	Park Avenue	357	0	1	328	0	0	1.6	0.0	1.4	358	328	-30	8%	1.6
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	A38 Gloucester Road (North)	536	14	6	586	5	6	2.1	2.9	0.0	556	597	41	7%	1.7
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	Bradley Stoke Way	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	Park Avenue	325	1	6	324	0	0	0.1	1.4	3.5	332	324	-8	2%	0.4
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	A38 Gloucester Road (North)	476	16	9	481	21	10	0.2	1.2	0.3	501	512	11	2%	0.5
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	Bradley Stoke Way	304	4	6	266	0	5	2.3	2.8	0.4	314	271	-43	14%	2.5
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	A38 Gloucester Road (South)	59	0	0	54	0	0	0.7	0.0	0.0	59	54	-5	8%	0.7
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	A38 Gloucester Road (North)	115	5	6	114	6	0	0.1	0.4	3.5	126	120	-6	5%	0.5
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	Bradley Stoke Way	66	1	2	59	0	0	0.9	1.4	2.0	69	59	-10	14%	1.3
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	A38 Gloucester Road (South)	37	1	0	35	2	0	0.3	0.8	0.0	38	37	-1	3%	0.2
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	Park Avenue	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	Bradley Stoke Way	919	12	4	937	23	1	0.6	2.6	1.9	935	961	26	3%	0.8
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	A38 Gloucester Road (South)	913	30	8	824	31	9	3.0	0.2	0.3	951	864	-87	9%	2.9
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	Park Avenue	1345	4	2	1225	8	0	3.3	1.6	2.0	1351	1233	-118	9%	3.3
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	A38 Gloucester Road (North)	0	1	0	0	0	0	0.0	1.4	0.0	1	0	-1	100%	1.4
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Bowsland Way	7	0	0	15	0	0	2.4	0.0	0.0	7	15	8	114%	2.4
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Bradley Stoke Way (East)	55	0	0	93	0	0	4.4	0.0	0.0	55	93	38	69%	4.4
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Brook Way	60	0	2	93	0	0	3.8	0.0	2.0	62	93	31	50%	3.5
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Bradley Stoke Way (West)	72	2	0	50	0	0	2.8	2.0	0.0	74	50	-24	32%	3.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Pear Tree Road	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Bradley Stoke Way (East)	97	0	0	65	0	0	3.6	0.0	0.0	97	65	-32	33%	3.6
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Brook Way	74	1	5	50	0	4	3.0	1.4	0.5	80	54	-26	33%	3.2
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Bradley Stoke Way (West)	134	0	2	147	1	0	1.1	1.4	2.0	136	148	12	9%	1.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Pear Tree Road	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Bowsland Way	1	0	0	0	0	0	1.4	0.0	0.0	1	0	-1	100%	1.4
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Brook Way	21	0	0	16	0	0	1.2	0.0	0.0	21	16	-5	24%	1.2
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Bradley Stoke Way (West)	225	5	1	213	3	0	0.8	1.0	1.4	231	216	-15	6%	1.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Pear Tree Road	71	0	1	79	0	0	0.9	0.0	1.4	72	79	7	10%	0.8
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Bowsland Way	19	0	0	7	0	0	3.3	0.0	0.0	19	7	-12	63%	3.3
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Bradley Stoke Way (East)	2	1	0	0	0	0	2.0	1.4	0.0	3	0	-3	100%	2.4
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Bradley Stoke Way (West)	275	2	6	268	0	6	0.4	2.0	0.0	283	274	-9	3%	0.5
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Pear Tree Road	118	0	0	91	0	0	2.6	0.0	0.0	118	91	-27	23%	2.6
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Bowsland Way	40	0	4	55	0	4	2.2	0.0	0.0	44	59	15	34%	2.1
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Bradley Stoke Way (East)	18	0	0	16	0	0	0.5	0.0	0.0	18	16	-2	11%	0.5
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Brook Way	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Pear Tree Road	55	0	0	31	0	1	3.7	0.0	1.4	55	32	-23	42%	3.5
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Bowsland Way	25	0	0	3	0	0	5.9	0.0	0.0	25	3	-22	88%	5.9
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Bradley Stoke Way (East)	222	4	2	226	1	0	0.3	1.9	2.0	228	227	-1	0%	0.1
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Brook Way	99	2	2	89	0	1	1.0	2.0	0.8	103	90	-13	13%	1.3
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Bradley Stoke Way (West)	3	1	0	0	0	0	2.4	1.4	0.0	4	0	-4	100%	2.8
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (East)	Hortham Lane	36	0	1	41	0	0	0.8	0.0	1.4	37	41	4	11%	0.6
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (East)	A38 Gloucester Road (West)	819	40	10	815	53	11	0.1	1.9	0.3	869	879	10	1%	0.3
Site 4	A38 Gloucester Road / Hortham Lane	Hortham Lane	A38 Gloucester Road (West)	204	1	1	192	0	0	0.9	1.4	1.4	206	192	-14	7%	1.0
Site 4	A38 Gloucester Road / Hortham Lane	Hortham Lane	A38 Gloucester Road (East)	84	0	2	87	0	0	0.3	0.0	2.0	86	87	1	1%	0.1
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (West)	A38 Gloucester Road (East)	809	27	13	826	23	17	0.6	0.8	1.0	849	866	17	2%	0.6
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (West)	Hortham Lane	71	3	1	70	0	0	0.1	2.4	1.4	75	70	-5	7%	0.6
Site 5	Bradley Stoke Way / Woodlands Lane	Woodlands Lane	Bradley Stoke Way (East)	20	1	0	27	0	0	1.4	1.4	0.0	21	27	6	29%	1.2
Site 5	Bradley Stoke Way / Woodlands Lane	Woodlands Lane	Bradley Stoke Way (West)	383	8	5	409	3	3	1.3	2.1	1.0	396	415	19	5%	0.9
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (East)	Bradley Stoke Way (West)	741	10	9	724	4	6	0.6	2.3	1.1	760	734	-26	3%	1.0
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (East)	Woodlands Lane	18	0	0	43	1	0	4.5	1.4	0.0	18	44	26	144%	4.7
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (West)	Woodlands Lane	914	11	8	903	22	4	0.4	2.7	1.6	933	929	-4	0%	0.1
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (West)	Bradley Stoke Way (East)	375	6	4	365	1	2	0.5	2.7	1.2	385	368	-17	4%	0.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Pear Tree Road	75	0	0	15	0	0	8.9	0.0	0.0	75	15	-60	80%	8.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Woodlands Lane (West)	286	7	5	344	2	4	3.3	2.4	0.5	298	350	52	17%	2.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Great Park Road	164	1	0	201	0	0	2.7	1.4	0.0	165	201	36	22%	2.7
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Woodlands Lane (East)	1	0	0	0	0	0	1.4	0.0	0.0	1	0	-1	100%	1.4
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Woodlands Lane (West)	52	0	0	39	1	0	1.9	1.4	0.0	52	40	-12	23%	1.8
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Great Park Road	85	0	1	76	0	0	1.0	0.0	1.4	86	76	-10	12%	1.1
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Woodlands Lane (East)	84	0	0	96	0	1	1.3	0.0	1.4	84	97	13	15%	1.4
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Pear Tree Road	2	0	0	0	0	0	2.0	0.0	0.0	2	0	-2	100%	2.0
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Great Park Road	418	0	0	442	0	0	1.2	0.0	0.0	418	442	24	6%	1.2
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Woodlands Lane (East)	316	7	7	267	15	4	2.9	2.4	1.3	330	286	-44	13%	2.5
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Pear Tree Road	15	2	1	36	1	0	4.2	0.8	1.4	18	37	19	106%	3.6
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Woodlands Lane (West)	0	1	0	0	0	0	0.0	1.4	0.0	1	0	-1	100%	1.4
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Woodlands Lane (East)	10	0	0	3	0	0	2.7	0.0	0.0	10	3	-7	70%	2.7
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Pear Tree Road	27	0	1	52	0	0	4.0	0.0	1.4	28	52	24	86%	3.8
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Woodlands Lane (West)	25	1	0	25	0	0	0.0	1.4	0.0	26	25	-1	4%	0.2
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Great Park Road	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane East	Foxfield Avenue	4	0	0	0	0	0	2.8	0.0	0.0	4	0	-4	100%	2.8
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane East	Woodlands Lane West	662	9	5	643	2	4	0.7	3.0	0.5	676	649	-27	4%	1.0
Site 7	Woodlands Lane / Foxfield Avenue	Foxfield Avenue	Woodlands Lane West	34	0	0	43	0	0	1.5	0.0	0.0	34	43	9	26%	1.5
Site 7	Woodlands Lane / Foxfield Avenue	Foxfield Avenue	Woodlands Lane East	6	0	0	14	0	0	2.5	0.0	0.0	6	14	8	133%	2.5
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane West	Woodlands Lane East	161	5	7	138	9	5	1.9	1.5	0.8	173	152	-21	12%	1.6
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane West	Foxfield Avenue	4	0	0	8	0	0	1.6	0.0	0.0	4	8	4	100%	1.6
Site 8	Foxfield Avenue / Bowsland Way	Foxfield Avenue	Bowsland Way (East)	9	0	0	6	0	0	1.1	0.0	0.0	9	6	-3	33%	1.1
Site 8	Foxfield Avenue / Bowsland Way	Foxfield Avenue	Bowsland Way (West)	17	0	0	17	0	0	0.0	0.0	0.0	17	17	0	0%	0.0
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (East)	Bowsland Way (West)	253	1	7	243	1	4	0.6	0.0	1.3	261	248	-13	5%	0.8
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (East)	Foxfield Avenue	9	0	0	0	0	0	4.2	0.0	0.0	9	0	-9	100%	4.2
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (West)	Foxfield Avenue	21	0	0	22	0	0	0.2	0.0	0.0	21	22	1	5%	0.2
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (West)	Bowsland Way (East)	88	0	4	61	0	4	3.1	0.0	0.0	92	65	-27	29%	3.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Ormonds Close	13	0	0	11	0	0	0.6	0.0	0.0	13	11	-2	15%	0.6
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Ellicks Close	25	0	0	24	0	0	0.2	0.0	0.0	25	24	-1	4%	0.2
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Bowsland Way	49	1	7	89	1	5	4.8	0.0	0.8	57	95	38	67%	4.4
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Trench Lane	1	0	0	0	0	0	1.4	0.0	0.0	1	0	-1	100%	1.4
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Ellicks Close	5	0	0	5	0	0	0.0	0.0	0.0	5	5	0	0%	0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Bowsland Way	69	0	0	48	0	0	2.7	0.0	0.0	69	48	-21	30%	2.7
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Trench Lane	35	0	0	59	0	0	3.5	0.0	0.0	35	59	24	69%	3.5
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Ormonds Close	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Bowsland Way	34	0	0	22	0	0	2.3	0.0	0.0	34	22	-12	35%	2.3
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Trench Lane	38	0	0	54	0	0	2.4	0.0	0.0	38	54	16	42%	2.4
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Ormonds Close	2	0	0	2	0	0	0.0	0.0	0.0	2	2	0	0%	0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Ellicks Close	1	0	0	1	0	0	0.0	0.0	0.0	1	1	0	0%	0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Trench Lane	46	0	4	56	0	4	1.4	0.0	0.0	50	60	10	20%	1.3
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Ormonds Close	12	0	0	7	0	0	1.6	0.0	0.0	12	7	-5	42%	1.6
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Ellicks Close	25	0	0	17	0	0	1.7	0.0	0.0	25	17	-8	32%	1.7
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Bowsland Way	9	0	0	0	0	0	4.2	0.0	0.0	9	0	-9	100%	4.2
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Trench Lane (South)	62	1	0	114	1	0	5.5	0.0	0.0	63	115	52	83%	5.5
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Trench Lane (North)	577	9	1	529	3	0	2.0	2.4	1.4	587	532	-55	9%	2.3
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Trench Lane (East)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Trench Lane (North)	48	0	4	67	0	4	2.5	0.0	0.0	52	71	19	37%	2.4
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Trench Lane (East)	72	0	0	104	0	0	3.4	0.0	0.0	72	104	32	44%	3.4
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Trench Lane (South)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Trench Lane (East)	82	5	0	96	8	0	1.5	1.2	0.0	87	104	17	20%	1.7
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Trench Lane (South)	26	0	7	11	0	5	3.5	0.0	0.8	33	16	-17	52%	3.4
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Trench Lane (North)	2	0	0	0	0	0	2.0	0.0	0.0	2	0	-2	100%	2.0

	122	
	118	
GEH<5	**96.7%**	
<1	51	41.8%
<2	80	65.6%
<3	102	83.6%
<4	113	92.6%
<5	118	96.7%
<6	121	99.2%
<7	121	99.2%
<8	121	99.2%

Junction No.	Junction Description	From Arm	To Arm	17:00-18:00									17:00-18:00				
				Observed			Modelled			GEH			TOTAL VEHICLES SUMMARY				
				Lights	Heavies	Buses	Lights	Heavies	Buses	Lights	Heavies	Buses	Observed	Modelled	Difference	%	GEH
Site 1	M5 East / A38 Gloucester	M5 (East)	A38 Gloucester Road (South)	733	11	2	778	8	0	1.6	1.0	2.0	746	786	40	5%	1.4
Site 1	M5 East / A38 Gloucester	M5 (East)	M5 (West)	6	0	0	0	0	0	3.5	0.0	0.0	6	0	-6	100%	3.5
Site 1	M5 East / A38 Gloucester	M5 (East)	A38 Gloucester Road (North)	297	4	0	292	2	0	0.3	1.2	0.0	301	294	-7	2%	0.4
Site 1	M5 East / A38 Gloucester	M5 (East)	M5 (East)	2	1	0	1	1	0	0.8	0.0	0.0	3	2	-1	33%	0.6
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	M5 (West)	691	3	0	719	7	0	1.1	1.8	0.0	694	726	32	5%	1.2
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	A38 Gloucester Road (North)	519	0	4	530	1	3	0.5	1.4	0.5	523	534	11	2%	0.5
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	M5 (East)	1254	15	2	1350	5	0	2.7	3.2	2.0	1271	1355	84	7%	2.3
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	A38 Gloucester Road (South)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 1	M5 East / A38 Gloucester	M5 (West)	A38 Gloucester Road (North)	543	14	0	562	8	0	0.8	1.8	0.0	557	570	13	2%	0.5
Site 1	M5 East / A38 Gloucester	M5 (West)	M5 (East)	16	1	0	0	0	0	5.7	1.4	0.0	17	0	-17	100%	5.6
Site 1	M5 East / A38 Gloucester	M5 (West)	A38 Gloucester Road (South)	555	5	1	607	7	0	2.2	0.8	1.4	561	614	53	9%	2.2
Site 1	M5 East / A38 Gloucester	M5 (West)	M5 (West)	3	1	0	0	0	0	2.4	1.4	0.0	4	0	-4	100%	2.8
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	M5 (East)	248	4	0	269	3	0	1.3	0.5	0.0	252	272	20	8%	1.2
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	A38 Gloucester Road (South)	423	2	6	399	2	3	1.2	0.0	1.4	431	404	-27	6%	1.3
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	M5 (West)	344	8	0	383	9	0	2.0	0.3	0.0	352	392	40	11%	2.1
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	A38 Gloucester Road (North)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	A38 Gloucester Road (South)	411	1	6	386	0	3	1.3	1.4	1.4	418	389	-29	7%	1.4
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	Park Avenue	56	0	1	52	0	0	0.5	0.0	1.4	57	52	-5	9%	0.7
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	A38 Gloucester Road (North)	845	5	1	803	3	1	1.5	1.0	0.0	851	807	-44	5%	1.5
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	Bradley Stoke Way	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	Park Avenue	37	0	0	42	0	0	0.8	0.0	0.0	37	42	5	14%	0.8
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	A38 Gloucester Road (North)	633	12	4	696	11	2	2.4	0.3	1.2	649	709	60	9%	2.3
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	Bradley Stoke Way	241	1	3	231	0	5	0.7	1.4	1.0	245	236	-9	4%	0.6
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	A38 Gloucester Road (South)	48	0	0	49	0	0	0.1	0.0	0.0	48	49	1	2%	0.1
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	A38 Gloucester Road (North)	985	1	1	1063	0	0	2.4	1.4	1.4	987	1063	76	8%	2.4
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	Bradley Stoke Way	240	1	0	250	0	0	0.6	1.4	0.0	241	250	9	4%	0.6
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	A38 Gloucester Road (South)	268	0	6	272	0	0	0.2	0.0	3.5	274	272	-2	1%	0.1
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	Park Avenue	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	Bradley Stoke Way	879	1	2	912	4	1	1.1	1.9	0.8	882	917	35	4%	1.2
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	A38 Gloucester Road (South)	766	13	3	771	13	2	0.2	0.0	0.6	782	786	4	1%	0.1
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	Park Avenue	69	4	4	83	0	0	1.6	2.8	2.8	77	83	6	8%	0.7
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	A38 Gloucester Road (North)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Bowsland Way	11	0	0	0	0	0	4.7	0.0	0.0	11	0	-11	100%	4.7
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Bradley Stoke Way (East)	92	1	0	67	0	0	2.8	1.4	0.0	93	67	-26	28%	2.9
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Brook Way	99	0	2	68	0	0	3.4	0.0	2.0	101	68	-33	33%	3.6
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Bradley Stoke Way (West)	106	0	0	113	0	0	0.7	0.0	0.0	106	113	7	7%	0.7
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Pear Tree Road	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Bradley Stoke Way (East)	81	0	0	51	0	0	3.7	0.0	0.0	81	51	-30	37%	3.7
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Brook Way	60	0	4	45	0	4	2.1	0.0	0.0	64	49	-15	23%	2.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Bradley Stoke Way (West)	69	0	0	50	0	0	2.5	0.0	0.0	69	50	-19	28%	2.5
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Pear Tree Road	5	0	0	0	0	0	3.2	0.0	0.0	5	0	-5	100%	3.2
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Bowsland Way	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Brook Way	50	0	0	55	0	0	0.7	0.0	0.0	50	55	5	10%	0.7
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Bradley Stoke Way (West)	277	1	2	294	0	0	1.0	1.4	2.0	280	294	14	5%	0.8
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Pear Tree Road	55	0	0	50	0	0	0.7	0.0	0.0	55	50	-5	9%	0.7
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Bowsland Way	75	0	0	57	0	0	2.2	0.0	0.0	75	57	-18	24%	2.2
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Bradley Stoke Way (East)	1	0	0	0	0	0	1.4	0.0	0.0	1	0	-1	100%	1.4
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Bradley Stoke Way (West)	227	1	1	240	0	1	0.9	1.4	0.0	229	241	12	5%	0.8
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Pear Tree Road	90	0	2	76	0	0	1.5	0.0	2.0	92	76	-16	17%	1.7
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Bowsland Way	89	1	4	77	0	4	1.3	1.4	0.0	94	81	-13	14%	1.4
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Bradley Stoke Way (East)	41	0	0	45	0	0	0.6	0.0	0.0	41	45	4	10%	0.6
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Brook Way	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Pear Tree Road	57	0	0	39	1	1	2.6	1.4	1.4	57	41	-16	28%	2.3
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Bowsland Way	99	0	0	82	0	0	1.8	0.0	0.0	99	82	-17	17%	1.8
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Bradley Stoke Way (East)	476	0	0	546	2	0	3.1	2.0	0.0	476	548	72	15%	3.2
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Brook Way	300	0	1	332	0	1	1.8	0.0	0.0	301	333	32	11%	1.8
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Bradley Stoke Way (West)	1	0	0	0	0	0	1.4	0.0	0.0	1	0	-1	100%	1.4
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (East)	Hortham Lane	54	0	0	59	0	0	0.7	0.0	0.0	54	59	5	9%	0.7
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (East)	A38 Gloucester Road (West)	818	14	5	855	15	3	1.3	0.3	1.0	837	873	36	4%	1.2
Site 4	A38 Gloucester Road / Hortham Lane	Hortham Lane	A38 Gloucester Road (West)	100	0	1	95	0	0	0.5	0.0	1.4	101	95	-6	6%	0.6
Site 4	A38 Gloucester Road / Hortham Lane	Hortham Lane	A38 Gloucester Road (East)	37	0	1	38	0	0	0.2	0.0	1.4	38	38	0	0%	0.0
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (West)	A38 Gloucester Road (East)	1109	18	3	1135	11	4	0.8	1.8	0.5	1130	1150	20	2%	0.6
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (West)	Hortham Lane	156	0	1	170	0	0	1.1	0.0	1.4	157	170	13	8%	1.0
Site 5	Bradley Stoke Way / Woodlands Lane	Woodlands Lane	Bradley Stoke Way (East)	33	0	0	55	0	0	3.3	0.0	0.0	33	55	22	67%	3.3
Site 5	Bradley Stoke Way / Woodlands Lane	Woodlands Lane	Bradley Stoke Way (West)	644	4	5	548	1	3	3.9	1.9	1.0	653	552	-101	15%	4.1
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (East)	Bradley Stoke Way (West)	668	2	3	688	1	1	0.8	0.8	1.4	673	690	17	3%	0.7
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (East)	Woodlands Lane	15	0	0	12	0	0	0.8	0.0	0.0	15	12	-3	20%	0.8
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (West)	Woodlands Lane	460	3	4	462	1	4	0.1	1.4	0.0	467	467	0	0%	0.0
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (West)	Bradley Stoke Way (East)	900	0	1	936	3	2	1.2	2.4	0.8	901	941	40	4%	1.3
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Pear Tree Road	94	1	0	74	0	0	2.2	1.4	0.0	95	74	-21	22%	2.3
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Woodlands Lane (West)	203	3	5	203	0	4	0.0	2.4	0.5	211	207	-4	2%	0.3
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Great Park Road	4	0	0	0	0	0	2.8	0.0	0.0	4	0	-4	100%	2.8
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Woodlands Lane (East)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Woodlands Lane (West)	27	0	0	6	1	0	5.2	1.4	0.0	27	7	-20	74%	4.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Great Park Road	15	0	2	12	0	0	0.8	0.0	2.0	17	12	-5	29%	1.3
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Woodlands Lane (East)	71	0	0	59	0	1	1.5	0.0	1.4	71	60	-11	15%	1.4
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Pear Tree Road	2	0	0	0	0	0	2.0	0.0	0.0	2	0	-2	100%	2.0
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Great Park Road	33	0	0	33	0	0	0.0	0.0	0.0	33	33	0	0%	0.0
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Woodlands Lane (East)	347	3	4	338	0	4	0.5	2.4	0.0	354	342	-12	3%	0.6
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Pear Tree Road	75	0	0	69	0	0	0.7	0.0	0.0	75	69	-6	8%	0.7
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Woodlands Lane (West)	2	0	0	0	0	0	2.0	0.0	0.0	2	0	-2	100%	2.0
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Woodlands Lane (East)	116	0	0	123	0	0	0.6	0.0	0.0	116	123	7	6%	0.6
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Pear Tree Road	131	0	2	141	0	0	0.9	0.0	2.0	133	141	8	6%	0.7
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Woodlands Lane (West)	254	0	0	198	0	0	3.7	0.0	0.0	254	198	-56	22%	3.7
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Great Park Road	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane East	Foxfield Avenue	11	0	0	0	0	0	4.7	0.0	0.0	11	0	-11	100%	4.7
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane East	Woodlands Lane West	140	3	5	120	4	4	1.8	0.5	0.5	148	128	-20	14%	1.7
Site 7	Woodlands Lane / Foxfield Avenue	Foxfield Avenue	Woodlands Lane West	6	0	0	10	0	0	1.4	0.0	0.0	6	10	4	67%	1.4
Site 7	Woodlands Lane / Foxfield Avenue	Foxfield Avenue	Woodlands Lane East	1	0	0	11	0	0	4.1	0.0	0.0	1	11	10	1000%	4.1
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane West	Woodlands Lane East	621	4	4	581	4	5	1.6	0.0	0.5	629	590	-39	6%	1.6
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane West	Foxfield Avenue	40	0	0	32	0	0	1.3	0.0	0.0	40	32	-8	20%	1.3
Site 8	Foxfield Avenue / Bowsland Way	Foxfield Avenue	Bowsland Way (East)	8	0	0	3	0	0	2.1	0.0	0.0	8	3	-5	63%	2.1
Site 8	Foxfield Avenue / Bowsland Way	Foxfield Avenue	Bowsland Way (West)	33	0	0	14	0	0	3.9	0.0	0.0	33	14	-19	58%	3.9
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (East)	Bowsland Way (West)	172	0	4	129	1	4	3.5	1.4	0.0	176	134	-42	24%	3.4
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (East)	Foxfield Avenue	6	0	0	0	0	0	3.5	0.0	0.0	6	0	-6	100%	3.5
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (West)	Foxfield Avenue	26	0	0	23	0	0	0.6	0.0	0.0	26	23	-3	12%	0.6
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (West)	Bowsland Way (East)	237	1	5	192	0	4	3.1	1.4	0.5	243	196	-47	19%	3.2
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Ormonds Close	44	0	0	70	0	0	3.4	0.0	0.0	44	70	26	59%	3.4
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Ellicks Close	42	0	0	50	0	0	1.2	0.0	0.0	42	50	8	19%	1.2
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Bowsland Way	63	0	4	60	1	4	0.4	1.4	0.0	67	65	-2	3%	0.2
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Trench Lane	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Ellicks Close	3	0	0	3	0	0	0.0	0.0	0.0	3	3	0	0%	0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Bowsland Way	32	0	0	24	0	0	1.5	0.0	0.0	32	24	-8	25%	1.5
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Trench Lane	15	0	0	29	0	0	3.0	0.0	0.0	15	29	14	93%	3.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Ormonds Close	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Bowsland Way	34	0	0	23	0	0	2.1	0.0	0.0	34	23	-11	32%	2.1
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Trench Lane	17	0	0	37	0	0	3.8	0.0	0.0	17	37	20	118%	3.8
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Ormonds Close	1	0	0	1	0	0	0.0	0.0	0.0	1	1	0	0%	0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Ellicks Close	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Trench Lane	48	0	5	15	0	4	5.9	0.0	0.5	53	19	-34	64%	5.7
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Ormonds Close	51	0	0	40	0	0	1.6	0.0	0.0	51	40	-11	22%	1.6
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Ellicks Close	26	0	0	23	0	0	0.6	0.0	0.0	26	23	-3	12%	0.6
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Bowsland Way	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Trench Lane (South)	89	0	0	73	0	0	1.8	0.0	0.0	89	73	-16	18%	1.8
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Trench Lane (North)	89	3	0	77	4	0	1.3	0.5	0.0	92	81	-11	12%	1.2
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Trench Lane (East)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Trench Lane (North)	20	0	5	14	0	4	1.5	0.0	0.5	25	18	-7	28%	1.5
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Trench Lane (East)	60	0	0	67	0	0	0.9	0.0	0.0	60	67	7	12%	0.9
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Trench Lane (South)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Trench Lane (East)	510	4	0	463	4	0	2.1	0.0	0.0	514	467	-47	9%	2.1
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Trench Lane (South)	60	0	4	109	0	5	5.3	0.0	0.5	64	114	50	78%	5.3
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Trench Lane (North)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0

	122	
	119	
GEH<5	**97.5%**	
<1	55	45.1%
<2	85	69.7%
<3	101	82.8%
<4	114	93.4%
<5	119	97.5%
<6	122	100.0%
<7	122	100.0%
<8	122	100.0%

Junction No.	Junction Description	From Arm	Approach / Exit	08:00-09:00									08:00-09:00				
				Observed			Modelled			GEH			TOTAL VEHICLES SUMMARY				
				Lights	Heavies	Buses	Lights	Heavies	Buses	Lights	Heavies	Buses	Observed	Modelled	Difference	%	GEH
Site 1	M5 East / A38 Gloucester	M5 (East)	Approach	2031	43	3	1963	41	0	1.5	0.3	2.4	2077	2004	-73	4%	1.6
Site 1	M5 East / A38 Gloucester	M5 (East)	Exit	652	33	4	645	29	0	0.3	0.7	2.8	689	674	-15	2%	0.6
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	Approach	1130	36	21	1185	32	16	1.6	0.7	1.2	1187	1233	46	4%	1.3
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	Exit	3175	47	14	3020	66	11	2.8	2.5	0.8	3236	3097	-139	4%	2.5
Site 1	M5 East / A38 Gloucester	M5 (West)	Approach	1165	26	0	1093	29	0	2.1	0.6	0.0	1191	1122	-69	6%	2.0
Site 1	M5 East / A38 Gloucester	M5 (West)	Exit	674	36	3	672	33	0	0.1	0.5	2.4	713	705	-8	1%	0.3
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	Approach	1079	41	11	1010	50	11	2.1	1.3	0.0	1131	1071	-60	5%	1.8
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	Exit	904	30	14	914	24	16	0.3	1.2	0.5	948	954	6	1%	0.2
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	Approach	1124	18	14	1142	6	9	0.5	3.5	1.5	1156	1157	1	0%	0.0
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	Exit	1289	17	12	1262	23	6	0.8	1.3	2.0	1318	1291	-27	2%	0.7
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	Approach	1164	21	21	1125	21	15	1.2	0.0	1.4	1206	1161	-45	4%	1.3
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	Exit	1240	35	15	1141	34	12	2.9	0.2	0.8	1290	1187	-103	8%	2.9
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	Approach	218	7	8	208	8	0	0.7	0.4	4.0	233	216	-17	7%	1.1
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	Exit	2027	5	9	1877	8	0	3.4	1.2	4.2	2041	1885	-156	8%	3.5
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	Approach	3177	47	14	2986	62	10	3.4	2.0	1.2	3238	3058	-180	6%	3.2
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	Exit	1127	36	21	1181	32	16	1.6	0.7	1.2	1184	1229	45	4%	1.3
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Approach	194	2	2	251	0	0	3.8	2.0	2.0	198	251	53	27%	3.5
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Exit	244	0	1	201	0	1	2.9	0.0	0.0	245	202	-43	18%	2.9
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Approach	306	1	7	262	1	4	2.6	0.0	1.3	314	267	-47	15%	2.8
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Exit	92	0	4	80	0	4	1.3	0.0	0.0	96	84	-12	13%	1.3
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Approach	338	6	2	315	3	0	1.3	1.4	2.0	346	318	-28	8%	1.5
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Exit	394	5	2	400	1	0	0.3	2.3	2.0	401	401	0	0%	0.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Approach	451	2	10	430	0	10	1.0	2.0	0.0	463	440	-23	5%	1.1
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Exit	254	3	9	248	0	5	0.4	2.4	1.5	266	253	-13	5%	0.8
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Approach	404	7	4	349	1	2	2.8	3.0	1.2	415	352	-63	15%	3.2
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Exit	709	10	9	678	4	6	1.2	2.3	1.1	728	688	-40	5%	1.5
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (East)	Approach	855	40	11	856	53	11	0.0	1.9	0.0	906	920	14	2%	0.5
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (East)	Exit	893	27	15	913	23	17	0.7	0.8	0.5	935	953	18	2%	0.6
Site 4	A38 Gloucester Road / Hortham Lane	Hortham Lane	Approach	288	1	3	279	0	0	0.5	1.4	2.4	292	279	-13	4%	0.8
Site 4	A38 Gloucester Road / Hortham Lane	Hortham Lane	Exit	107	3	2	111	0	0	0.4	2.4	2.0	112	111	-1	1%	0.1
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (West)	Approach	880	30	14	896	23	17	0.5	1.4	0.8	924	936	12	1%	0.4
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (West)	Exit	1023	41	11	1007	53	11	0.5	1.8	0.0	1075	1071	-4	0%	0.1
Site 5	Bradley Stoke Way / Woodlands Lane	Woodlands Lane	Approach	403	9	5	436	3	3	1.6	2.4	1.0	417	442	25	6%	1.2
Site 5	Bradley Stoke Way / Woodlands Lane	Woodlands Lane	Exit	932	11	8	946	23	4	0.5	2.9	1.6	951	973	22	2%	0.7
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (East)	Approach	759	10	9	767	5	6	0.3	1.8	1.1	778	778	0	0%	0.0
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (East)	Exit	395	7	4	392	1	2	0.2	3.0	1.2	406	395	-11	3%	0.5
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (West)	Approach	1289	17	12	1268	23	6	0.6	1.3	2.0	1318	1297	-21	2%	0.6
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (West)	Exit	1124	18	14	1133	7	9	0.3	3.1	1.5	1156	1149	-7	1%	0.2
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Approach	526	8	5	560	2	4	1.5	2.7	0.5	539	566	27	5%	1.1
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Exit	411	7	7	366	15	5	2.3	2.4	0.8	425	386	-39	9%	1.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Approach	223	0	1	211	1	1	0.8	1.4	0.0	224	213	-11	5%	0.7
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Exit	119	2	2	103	1	0	1.5	0.8	2.0	123	104	-19	15%	1.8
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Approach	749	10	8	745	16	4	0.1	1.7	1.6	767	765	-2	0%	0.1
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Exit	363	9	5	408	3	4	2.3	2.4	0.5	377	415	38	10%	1.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Approach	62	1	1	80	0	0	2.1	1.4	1.4	64	80	16	25%	1.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Exit	667	1	1	719	0	0	2.0	1.4	1.4	669	719	50	7%	1.9
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane East	Approach	666	9	5	643	2	4	0.9	3.0	0.5	680	649	-31	5%	1.2
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane East	Exit	167	5	7	152	9	5	1.2	1.5	0.8	179	166	-13	7%	1.0
Site 7	Woodlands Lane / Foxfield Avenue	Foxfield Avenue	Approach	40	0	0	57	0	0	2.4	0.0	0.0	40	57	17	43%	2.4
Site 7	Woodlands Lane / Foxfield Avenue	Foxfield Avenue	Exit	8	0	0	8	0	0	0.0	0.0	0.0	8	8	0	0%	0.0
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane West	Approach	165	5	7	146	9	5	1.5	1.5	0.8	177	160	-17	10%	1.3
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane West	Exit	696	9	5	686	2	4	0.4	3.0	0.5	710	692	-18	3%	0.7
Site 8	Foxfield Avenue / Bowsland Way	Foxfield Avenue	Approach	26	0	0	23	0	0	0.6	0.0	0.0	26	23	-3	12%	0.6
Site 8	Foxfield Avenue / Bowsland Way	Foxfield Avenue	Exit	30	0	0	22	0	0	1.6	0.0	0.0	30	22	-8	27%	1.6
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (East)	Approach	262	1	7	243	1	4	1.2	0.0	1.3	270	248	-22	8%	1.4
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (East)	Exit	97	0	4	67	0	4	3.3	0.0	0.0	101	71	-30	30%	3.2
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (West)	Approach	109	0	4	83	0	4	2.7	0.0	0.0	113	87	-26	23%	2.6
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (West)	Exit	270	1	7	260	1	4	0.6	0.0	1.3	278	265	-13	5%	0.8
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Approach	88	1	7	124	1	5	3.5	0.0	0.8	96	130	34	35%	3.2
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Exit	120	0	4	169	0	4	4.1	0.0	0.0	124	173	49	40%	4.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Approach	109	0	0	112	0	0	0.3	0.0	0.0	109	112	3	3%	0.3
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Exit	27	0	0	20	0	0	1.4	0.0	0.0	27	20	-7	26%	1.4
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Approach	75	0	0	79	0	0	0.5	0.0	0.0	75	79	4	5%	0.5
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Exit	56	0	0	47	0	0	1.3	0.0	0.0	56	47	-9	16%	1.3
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Approach	92	0	4	80	0	4	1.3	0.0	0.0	96	84	-12	13%	1.3
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Exit	161	1	7	159	1	5	0.2	0.0	0.8	169	165	-4	2%	0.3
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Approach	639	10	1	643	4	0	0.2	2.3	1.4	650	647	-3	0%	0.1
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Exit	154	5	0	200	8	0	3.5	1.2	0.0	159	208	49	31%	3.6
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Approach	120	0	4	171	0	4	4.2	0.0	0.0	124	175	51	41%	4.2
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Exit	88	1	7	125	1	5	3.6	0.0	0.8	96	131	35	36%	3.3
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Approach	110	5	7	107	8	5	0.3	1.2	0.8	122	120	-2	2%	0.2
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Exit	627	9	5	596	3	4	1.3	2.4	0.5	641	603	-38	6%	1.5

	72	
	72	
GEH<5	**100.0%**	
<1	30	41.7%
<2	56	77.8%
<3	62	86.1%
<4	71	98.6%
<5	72	100.0%
<6	72	100.0%
<7	72	100.0%
<8	72	100.0%
<700vehs	within 100	
pass	47	100.0%
fail	0	0.0%
700-2700	<15%	
pass	23	100.0%
fail	0	0.0%
>2700vehs	within 400	
pass	2	100.0%
fail	0	0.0%

Junction No.	Junction Description	From Arm	Approach / Exit	17:00-18:00									17:00-18:00				
				Observed			Modelled			GEH			TOTAL VEHICLES SUMMARY				
				Lights	Heavies	Buses	Lights	Heavies	Buses	Lights	Heavies	Buses	Observed	Modelled	Difference	%	GEH
Site 1	M5 East / A38 Gloucester	M5 (East)	Approach	1038	16	2	1071	11	0	1.0	1.4	2.0	1056	1082	26	2%	0.8
Site 1	M5 East / A38 Gloucester	M5 (East)	Exit	1520	21	2	1620	9	0	2.5	3.1	2.0	1543	1629	86	6%	2.2
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	Approach	2464	18	6	2599	13	3	2.7	1.3	1.4	2488	2615	127	5%	2.5
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	Exit	1711	18	9	1784	17	3	1.7	0.2	2.4	1738	1804	66	4%	1.6
Site 1	M5 East / A38 Gloucester	M5 (West)	Approach	1117	21	1	1169	15	0	1.5	1.4	1.4	1139	1184	45	4%	1.3
Site 1	M5 East / A38 Gloucester	M5 (West)	Exit	1044	12	0	1102	16	0	1.8	1.1	0.0	1056	1118	62	6%	1.9
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	Approach	1015	14	6	1051	14	3	1.1	0.0	1.4	1035	1068	33	3%	1.0
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	Exit	1359	18	4	1384	11	3	0.7	1.8	0.5	1381	1398	17	1%	0.5
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	Approach	1312	6	8	1241	3	4	2.0	1.4	1.6	1326	1248	-78	6%	2.2
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	Exit	1360	3	5	1393	4	6	0.9	0.5	0.4	1368	1403	35	3%	0.9
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	Approach	959	13	7	1018	11	7	1.9	0.6	0.0	979	1036	57	6%	1.8
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	Exit	1493	14	15	1478	13	5	0.4	0.3	3.2	1522	1496	-26	2%	0.7
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	Approach	1493	2	7	1585	0	0	2.3	2.0	3.7	1502	1585	83	6%	2.1
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	Exit	162	4	5	177	0	0	1.2	2.8	3.2	171	177	6	4%	0.5
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	Approach	1714	18	9	1766	17	3	1.2	0.2	2.4	1741	1786	45	3%	1.1
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	Exit	2463	18	6	2562	14	3	2.0	1.0	1.4	2487	2579	92	4%	1.8
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Approach	308	1	2	248	0	0	3.6	1.4	2.0	311	248	-63	20%	3.8
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Exit	207	0	2	165	1	1	3.1	1.4	0.8	209	167	-42	20%	3.1
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Approach	215	0	4	146	0	4	5.1	0.0	0.0	219	150	-69	32%	5.1
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Exit	274	1	4	216	0	4	3.7	1.4	0.0	279	220	-59	21%	3.7
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Approach	458	1	2	456	0	0	0.1	1.4	2.0	461	456	-5	1%	0.2
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Exit	691	1	0	709	2	0	0.7	0.8	0.0	692	711	19	3%	0.7
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Approach	447	2	7	438	0	5	0.4	2.0	0.8	456	443	-13	3%	0.6
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Exit	509	0	7	500	0	5	0.4	0.0	0.8	516	505	-11	2%	0.5
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Approach	933	0	1	999	3	2	2.1	2.4	0.8	934	1004	70	7%	2.2
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Exit	680	2	3	697	0	1	0.6	2.0	1.4	685	698	13	2%	0.5
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (East)	Approach	872	14	5	914	15	3	1.4	0.3	1.0	891	932	41	5%	1.4
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (East)	Exit	1146	18	4	1173	11	4	0.8	1.8	0.0	1168	1188	20	2%	0.6
Site 4	A38 Gloucester Road / Hortham Lane	Hortham Lane	Approach	137	0	2	133	0	0	0.3	0.0	2.0	139	133	-6	4%	0.5
Site 4	A38 Gloucester Road / Hortham Lane	Hortham Lane	Exit	210	0	1	229	0	0	1.3	0.0	1.4	211	229	18	9%	1.2
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (West)	Approach	1265	18	4	1305	11	4	1.1	1.8	0.0	1287	1320	33	3%	0.9
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (West)	Exit	918	14	6	950	15	3	1.0	0.3	1.4	938	968	30	3%	1.0
Site 5	Bradley Stoke Way / Woodlands Lane	Woodlands Lane	Approach	677	4	5	603	1	3	2.9	1.9	1.0	686	607	-79	12%	3.1
Site 5	Bradley Stoke Way / Woodlands Lane	Woodlands Lane	Exit	475	3	4	474	1	4	0.0	1.4	0.0	482	479	-3	1%	0.1
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (East)	Approach	683	2	3	700	1	1	0.6	0.8	1.4	688	702	14	2%	0.5
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (East)	Exit	933	0	1	991	3	2	1.9	2.4	0.8	934	996	62	7%	2.0
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (West)	Approach	1360	3	5	1398	4	6	1.0	0.5	0.4	1368	1408	40	3%	1.1
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (West)	Exit	1312	6	8	1236	2	4	2.1	2.0	1.6	1326	1242	-84	6%	2.3
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Approach	301	4	5	277	0	4	1.4	2.8	0.5	310	281	-29	9%	1.7
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Exit	534	3	4	520	0	5	0.6	2.4	0.5	541	525	-16	3%	0.7
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Approach	115	0	2	77	1	1	3.9	1.4	0.8	117	79	-38	32%	3.8
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Exit	302	1	2	284	0	0	1.1	1.4	2.0	305	284	-21	7%	1.2
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Approach	457	3	4	440	0	4	0.8	2.4	0.0	464	444	-20	4%	0.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Exit	486	3	5	407	1	4	3.7	1.4	0.5	494	412	-82	17%	3.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Approach	501	0	2	462	0	0	1.8	0.0	2.0	503	462	-41	8%	1.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Exit	52	0	2	45	0	0	1.0	0.0	2.0	54	45	-9	17%	1.3
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane East	Approach	151	3	5	120	4	4	2.7	0.5	0.5	159	128	-31	19%	2.6
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane East	Exit	622	4	4	592	4	5	1.2	0.0	0.5	630	601	-29	5%	1.2
Site 7	Woodlands Lane / Foxfield Avenue	Foxfield Avenue	Approach	7	0	0	21	0	0	3.7	0.0	0.0	7	21	14	200%	3.7
Site 7	Woodlands Lane / Foxfield Avenue	Foxfield Avenue	Exit	51	0	0	32	0	0	2.9	0.0	0.0	51	32	-19	37%	2.9
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane West	Approach	661	4	4	613	4	5	1.9	0.0	0.5	669	622	-47	7%	1.8
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane West	Exit	146	3	5	130	4	4	1.4	0.5	0.5	154	138	-16	10%	1.3
Site 8	Foxfield Avenue / Bowsland Way	Foxfield Avenue	Approach	41	0	0	17	0	0	4.5	0.0	0.0	41	17	-24	59%	4.5
Site 8	Foxfield Avenue / Bowsland Way	Foxfield Avenue	Exit	32	0	0	23	0	0	1.7	0.0	0.0	32	23	-9	28%	1.7
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (East)	Approach	178	0	4	129	1	4	4.0	1.4	0.0	182	134	-48	26%	3.8
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (East)	Exit	245	1	5	195	0	4	3.4	1.4	0.5	251	199	-52	21%	3.5
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (West)	Approach	263	1	5	215	0	4	3.1	1.4	0.5	269	219	-50	19%	3.2
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (West)	Exit	205	0	4	143	1	4	4.7	1.4	0.0	209	148	-61	29%	4.6
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Approach	149	0	4	180	1	4	2.4	1.4	0.0	153	185	32	21%	2.5
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Exit	80	0	5	81	0	4	0.1	0.0	0.5	85	85	0	0%	0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Approach	50	0	0	56	0	0	0.8	0.0	0.0	50	56	6	12%	0.8
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Exit	96	0	0	111	0	0	1.5	0.0	0.0	96	111	15	16%	1.5
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Approach	52	0	0	61	0	0	1.2	0.0	0.0	52	61	9	17%	1.2
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Exit	71	0	0	76	0	0	0.6	0.0	0.0	71	76	5	7%	0.6
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Approach	125	0	5	78	0	4	4.7	0.0	0.5	130	82	-48	37%	4.7
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Exit	129	0	4	107	1	4	2.0	1.4	0.0	133	112	-21	16%	1.9
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Approach	178	3	0	150	4	0	2.2	0.5	0.0	181	154	-27	15%	2.1
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Exit	570	4	0	530	4	0	1.7	0.0	0.0	574	534	-40	7%	1.7
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Approach	80	0	5	81	0	4	0.1	0.0	0.5	85	85	0	0%	0.0
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Exit	149	0	4	182	0	5	2.6	0.0	0.5	153	187	34	22%	2.6
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Approach	570	4	4	572	4	5	0.1	0.0	0.5	578	581	3	1%	0.1
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Exit	109	3	5	91	4	4	1.8	0.5	0.5	117	99	-18	15%	1.7

	72	
	71	
GEH<5	**98.6%**	
<1	24	33.3%
<2	47	65.3%
<3	58	80.6%
<4	68	94.4%
<5	71	98.6%
<6	72	100.0%
<7	72	100.0%
<8	72	100.0%
<700vehs	within 100	
pass	49	100.0%
fail	0	0.0%
700-2700	<15%	
pass	23	100.0%
fail	0	0.0%
>2700vehs	within 400	
pass	0	-
fail	0	-

		08:00-09:00				
		Observed	Modelled	Difference	%	GEH
Site 1 NB	A38 Gloucester Road NB	906	951	46	5%	1.5
Site 1 SB	A38 Gloucester Road SB	912	919	8	1%	0.2
Site 2 EB	Hortham Lane EB	56	33	-23	41%	3.5
Site 2 WB	Hortham Lane WB	126	81	-45	36%	4.4
Site 3 EB	Trench Lane EB	166	207	41	25%	3.0
Site 3 WB	Trench Lane WB	635	646	11	2%	0.4
Site 4 EB	Bowsland Way EB	125	77	-48	38%	4.8
Site 4 WB	Bowsland Way WB	199	205	6	3%	0.4
Site 5 EB	Bradley Stoke Way EB	422	404	-18	4%	0.9
Site 5 WB	Bradley Stoke Way WB	390	321	-69	18%	3.6
Site 6 NB	Brook Way NB	435	441	6	1%	0.3
Site 6 SB	Brook Way SB	275	251	-24	9%	1.5

17:00-18:00				
Observed	Modelled	Difference	%	GEH
1159	1187	28	2%	0.8
886	930	44	5%	1.5
114	75	-39	34%	4.0
66	42	-24	36%	3.2
543	534	-9	2%	0.4
205	152	-53	26%	3.9
158	136	-22	14%	1.8
142	116	-26	18%	2.3
708	708	0	0%	0.0
497	452	-45	9%	2.1
439	441	2	0%	0.1
450	503	53	12%	2.4

	12	
	12	
GEH<5	**100.0%**	
<3	8	66.7%
<4	10	83.3%
<5	12	100.0%
<6	12	100.0%
<7	12	100.0%
<8	12	100.0%
<9	12	100.0%
<10	12	100.0%
<700vehs	within 100	
pass	10	100.0%
fail	0	0.0%
700-2700	<15%	
pass	2	100.0%
fail	0	0.0%
>2700vehs	within 400	
pass	0	-
fail	0	-

	12	
	12	
GEH<5	**100.0%**	
<3	9	75.0%
<4	12	100.0%
<5	12	100.0%
<6	12	100.0%
<7	12	100.0%
<8	12	100.0%
<9	12	100.0%
<10	12	100.0%
<700vehs	within 100	
pass	9	100.0%
fail	0	0.0%
700-2700	<15%	
pass	3	100.0%
fail	0	0.0%
>2700vehs	within 400	
pass	0	-
fail	0	-

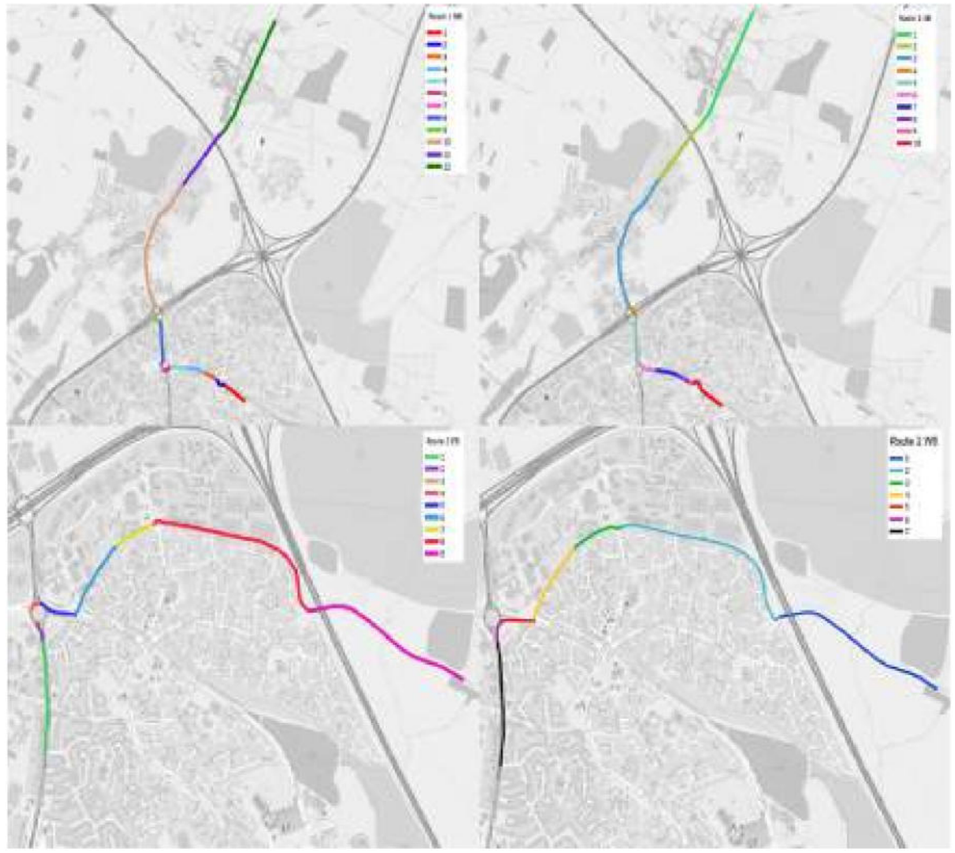
Route	Observed	Modelled	08:00-09:00		
	08:00-09:00	08:00-09:00	Diff (s)	Diff (%)	Pass or Fail
R1 NB 1	25	24	1	-3%	PASS
R1 NB 2	17	13	4	-22%	PASS
R1 NB 3	14	14	0	-2%	PASS
R1 NB 4	23	27	4	19%	PASS
R1 NB 5	65	70	5	8%	PASS
R1 NB 6	14	30	16	113%	PASS
R1 NB 7	11	8	3	-28%	PASS
R1 NB 8	78	71	7	-9%	PASS
R1 NB 9	37	17	20	-53%	PASS
R1 NB 10	113	108	5	-5%	PASS
R1 NB 11	44	58	15	34%	PASS
R1 NB 12	46	57	11	23%	PASS
R1 NB Total	***485***	***496***	***11***	***2%***	***PASS***
R1 SB 1	71	54	17	-24%	PASS
R1 SB 2	62	57	5	-8%	PASS
R1 SB 3	149	203	54	36%	PASS
R1 SB 4	32	48	16	50%	PASS
R1 SB 5	41	77	36	88%	PASS
R1 SB 6	63	19	43	-69%	PASS
R1 SB 7	21	27	7	33%	PASS
R1 SB 8	18	16	2	-11%	PASS
R1 SB 9	4	5	1	30%	PASS
R1 SB 10	35	28	7	-20%	PASS
R1 SB Total	***494***	***534***	***39***	***8%***	***PASS***
R2 EB 1	31	78	47	150%	PASS
R2 EB 2	35	37	3	8%	PASS
R2 EB 3	23	7	16	-68%	PASS
R2 EB 4	26	38	11	43%	PASS
R2 EB 5	27	29	2	8%	PASS
R2 EB 6	33	42	9	26%	PASS
R2 EB 7	26	30	5	19%	PASS
R2 EB 8	88	97	9	10%	PASS
R2 EB 9	64	50	14	-22%	PASS
R2 EB Total	***354***	***409***	***55***	***15%***	***PASS***
R2 WB 1	64	50	13	-21%	PASS
R2 WB 2	88	113	25	28%	PASS
R2 WB 3	25	28	2	8%	PASS
R2 WB 4	53	70	17	32%	PASS
R2 WB 5	117	72	45	-39%	PASS
R2 WB 6	15	10	5	-37%	PASS
R2 WB 7	34	36	2	6%	PASS
R2 WB Total	***396***	***377***	***19***	***-5%***	***PASS***

Route	Observed	Modelled	17:00-18:00		
	17:00-18:00	17:00-18:00	Diff (s)	Diff (%)	Pass or Fail
R1 NB 1	21	30	9	43%	PASS
R1 NB 2	13	15	2	18%	PASS
R1 NB 3	11	13	2	16%	PASS
R1 NB 4	20	24	4	23%	PASS
R1 NB 5	73	40	33	-45%	PASS
R1 NB 6	13	7	6	-46%	PASS
R1 NB 7	7	28	20	270%	PASS
R1 NB 8	55	58	3	5%	PASS
R1 NB 9	11	14	3	30%	PASS
R1 NB 10	102	122	19	19%	PASS
R1 NB 11	53	66	13	24%	PASS
R1 NB 12	42	57	15	35%	PASS
R1 NB Total	***421***	***473***	***52***	***12%***	***PASS***
R1 SB 1	52	53	2	3%	PASS
R1 SB 2	46	56	10	21%	PASS
R1 SB 3	132	147	15	11%	PASS
R1 SB 4	10	18	8	76%	PASS
R1 SB 5	108	56	53	-49%	PASS
R1 SB 6	44	27	17	-38%	PASS
R1 SB 7	20	24	5	24%	PASS
R1 SB 8	15	21	6	39%	PASS
R1 SB 9	4	7	3	66%	PASS
R1 SB 10	28	29	1	5%	PASS
R1 SB Total	***458***	***437***	***21***	***-5%***	***PASS***
R2 EB 1	48	38	10	-22%	PASS
R2 EB 2	18	33	15	87%	PASS
R2 EB 3	11	7	3	-31%	PASS
R2 EB 4	29	32	3	10%	PASS
R2 EB 5	27	34	7	27%	PASS
R2 EB 6	36	38	2	6%	PASS
R2 EB 7	25	23	1	-5%	PASS
R2 EB 8	102	111	9	9%	PASS
R2 EB 9	69	54	16	-23%	PASS
R2 EB Total	***364***	***371***	***6***	***2%***	***PASS***
R2 WB 1	62	46	16	-26%	PASS
R2 WB 2	87	94	7	8%	PASS
R2 WB 3	51	29	22	-44%	PASS
R2 WB 4	135	137	2	1%	PASS
R2 WB 5	75	51	24	-33%	PASS
R2 WB 6	15	10	6	-38%	PASS
R2 WB 7	45	37	9	-19%	PASS
R2 WB Total	***471***	***402***	***69***	***-15%***	***PASS***

Route		AM Base	Run A AM All Sites + TEMPRO	Run B AM All Sites + TEMPRO + Dev	Run C AM All Sites	Run D AM All Sites + Dev	Run E AM All Sites + Capped TEMPRO	Run F AM All Sites + Capped TEMPRO + Dev	
R1 NB 1	*1*	24	24	24	23	23	24	24	0
R1 NB 2	*2*	13	12	12	12	12	12	12	0
R1 NB 3	*3*	14	15	14	14	14	14	14	0
R1 NB 4	*4*	27	59	56	33	37	48	39	-9
R1 NB 5	*5*	70	124	124	92	110	123	79	-45
R1 NB 6	*6*	30	29	28	28	25	28	26	-2
R1 NB 7	*7*	8	8	8	8	7	8	8	0
R1 NB 8	*8*	71	59	59	59	59	60	59	-1
R1 NB 9	*9*	17	19	19	19	19	18	18	0
R1 NB 10	*10*	108	116	115	115	113	117	115	-2
R1 NB 11	*11*	58	59	62	59	61	60	62	2
R1 NB 12	*12*	57	58	58	58	58	58	59	1
AM R1 NB		**496**	**582**	**579**	**518**	**537**	**569**	**515**	-54
R1 SB 1	*13*	54	97	105	77	91	88	108	20
R1 SB 2	*14*	57	91	72	67	70	78	75	-4
R1 SB 3	*15*	203	310	215	136	137	274	242	-32
R1 SB 4	*16*	48	35	27	14	14	32	31	0
R1 SB 5	*17*	77	46	45	39	38	46	45	-1
R1 SB 6	*18*	19	23	24	21	21	21	21	0
R1 SB 7	*19*	27	28	28	28	27	28	27	0
R1 SB 8	*20*	16	16	16	16	16	16	16	0
R1 SB 9	*21*	5	4	4	4	4	4	4	0
R1 SB 10	*22*	28	31	31	29	29	31	29	-3
AM R1 SB		**534**	**681**	**565**	**430**	**448**	**618**	**598**	-21
R2 EB 1	*23*	78	338	342	179	283	318	324	6
R2 EB 2	*24*	37	46	46	45	48	46	46	0
R2 EB 3	*25*	7	7	7	7	7	7	7	0
R2 EB 4	*26*	38	36	36	36	38	36	36	0
R2 EB 5	*27*	29	31	31	29	30	30	29	0
R2 EB 6	*28*	42	50	51	44	47	47	46	-1
R2 EB 7	*29*	30	42	44	32	40	36	45	8
R2 EB 8	*30*	97	100	110	101	108	104	108	4
R2 EB 9	*31*	50	50	54	51	53	50	53	3
AM R2 EB		**409**	**700**	**721**	**525**	**655**	**674**	**695**	21
R2 WB 1	*32*	50	56	233	51	53	52	66	15
R2 WB 2	*33*	113	246	465	118	158	161	236	75
R2 WB 3	*34*	28	193	218	28	41	115	28	-87
R2 WB 4	*35*	70	357	359	73	149	291	64	-227
R2 WB 5	*36*	72	125	127	89	105	121	79	-42
R2 WB 6	*37*	10	9	9	9	9	9	9	0
R2 WB 7	*38*	36	37	37	37	37	37	37	0
AM R2 WB		**377**	**1024**	**1447**	**405**	**553**	**786**	**520**	-266

17:00-18:00

Route	PM Base	Run A PM All Sites + TEMPRO	Run B PM All Sites + TEMPRO + Dev	Run C PM All Sites	Run D PM All Sites + Dev	Run E PM All Sites + Capped TEMPRO	Run F PM All Sites + Capped TEMPRO + Dev	
R1 NB 1	30	66	48	25	25	45	27	-18
R1 NB 2	15	34	28	12	12	23	16	-7
R1 NB 3	13	57	43	13	13	35	23	-12
R1 NB 4	24	234	190	51	45	176	116	-60
R1 NB 5	40	114	111	73	62	111	92	-19
R1 NB 6	7	44	41	34	26	43	38	-5
R1 NB 7	28	52	49	46	43	49	49	-1
R1 NB 8	58	156	154	155	152	155	154	-1
R1 NB 9	14	20	18	20	20	20	18	-1
R1 NB 10	122	205	207	202	217	206	213	8
R1 NB 11	66	72	83	71	84	72	82	11
R1 NB 12	57	58	60	58	59	58	59	1
PM R1 NB	**473**	**1110**	**1032**	**761**	**759**	**991**	**888**	-103
R1 SB 1	53	104	110	69	111	95	104	9
R1 SB 2	56	91	117	59	61	79	107	29
R1 SB 3	147	526	616	335	424	488	600	112
R1 SB 4	18	17	16	19	16	16	16	0
R1 SB 5	56	46	43	46	43	46	43	-3
R1 SB 6	27	28	25	27	25	27	25	-2
R1 SB 7	24	26	25	26	25	25	25	0
R1 SB 8	21	20	19	19	18	20	19	-1
R1 SB 9	7	6	6	5	5	6	6	0
R1 SB 10	29	32	31	29	29	30	29	-1
PM R1 SB	**437**	**895**	**1011**	**633**	**757**	**832**	**974**	142
R2 EB 1	38	486	460	359	376	464	455	-9
R2 EB 2	33	63	60	58	56	60	60	-1
R2 EB 3	7	24	23	19	17	23	21	-2
R2 EB 4	32	17	17	18	18	16	17	1
R2 EB 5	34	30	28	29	27	29	27	-1
R2 EB 6	38	41	42	38	42	39	41	2
R2 EB 7	23	24	30	23	25	23	27	3
R2 EB 8	111	115	127	112	126	110	128	19
R2 EB 9	54	54	57	54	58	54	58	4
PM R2 EB	**371**	**854**	**845**	**708**	**745**	**818**	**834**	17
R2 WB 1	46	47	55	47	54	47	56	9
R2 WB 2	94	126	336	98	138	97	186	89
R2 WB 3	29	133	193	30	122	53	145	92
R2 WB 4	137	231	233	108	206	180	221	41
R2 WB 5	51	107	103	74	65	103	86	-17
R2 WB 6	10	9	9	9	9	9	9	0
R2 WB 7	37	37	37	37	36	37	36	0
PM R2 WB	**402**	**689**	**964**	**401**	**631**	**525**	**739**	214



	08:00-09:00		
		Run E	Run F
	AM Base	AM All Sites + Capped TEMPRO	AM All Sites + Capped TEMPRO + Dev
Average Delay per Vehicle (s)	106	130	130
Average Speed per Vehicle (mph)	20	18	18
Total Travel Time (hrs)	891	1139	1202
Total Delay Time (hrs)	464	647	666
Vehicles Active in the Network	1046	1408	1462
Vehicles Completed Trip	14684	16513	16996
Total Latent Delay (hrs)	1	182	328
Total Latent Demand	12	232	454
Total Peak Hour Veh Numbers	15742	18153	18912
Average Delay per Veh (s) (inc. Latent Demand)	106.4	164.3	189.3

	17:00-18:00		
		Run E	Run F
	PM Base	PM All Sites + Capped TEMPRO	PM All Sites + Capped TEMPRO + Dev
Average Delay per Vehicle (s)	70	227	244
Average Speed per Vehicle (mph)	25	13	12
Total Travel Time (hrs)	779	1646	1836
Total Delay Time (hrs)	321	1160	1296
Vehicles Active in the Network	629	1887	1983
Vehicles Completed Trip	15899	16529	17170
Total Latent Delay (hrs)	4	386	502
Total Latent Demand	0	891	1089
Total Peak Hour Veh Numbers	16528	19307	20242
Average Delay per Veh (s) (inc. Latent Demand)	70.7	288.3	319.7

Queue in Metres

Table 6.5: A38 / M5 Junction				
	AM Peak		PM Peak	
Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	2036 Base + CD	2036 Base + CD + Woodlands
A38 Gloucester Road North	195	158	436	454
M5 East	251	285	413	484
A38 Gloucester Road South	30	30	436	429
M5 West	58	103	327	273

Impact		
Approach Name	AM	PM
A38 Gloucester Road North	-37	18
M5 East	34	71
A38 Gloucester Road South	0	-7
M5 West	46	-54

Table 6.6: Aztec West Roundabout				
	AM Peak		PM Peak	
Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	2036 Base + CD	2036 Base + CD + Woodlands
A38 Gloucester Road North (Ahead/Right	313	293	13	11
A38 Gloucester Road North (Left)	37	46	11	9
Bradley Stoke Way	121	67	109	84
A38 Gloucester Road South	452	458	486	486
Park Avenue	4	4	200	180

Impact		
Approach Name	AM	PM
A38 Gloucester Road North (Ahead	-20	-2
A38 Gloucester Road North (Left)	9	-2
Bradley Stoke Way	-54	-24
A38 Gloucester Road South	6	-1
Park Avenue	0	-20

Table 6.8 Woodlands Lane				
	AM Peak		PM Peak	
Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	2036 Base + CD	2036 Base + CD + Woodlands
Woodlands Lane (Right)	311	33	252	409
Woodlands Lane (Left)	162	2	191	410
Bradley Stoke Way East	23	16	184	96
Bradley Stoke Way West	11	11	23	20

Impact		
Approach Name	AM	PM
Woodlands Lane (Right)	-277	157
Woodlands Lane (Left)	-160	218
Bradley Stoke Way East	-7	-88
Bradley Stoke Way West	-1	-3

Table 6.9 Pear Tree / Bradley Stoke Way				
	AM Peak		PM Peak	
Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	2036 Base + CD	2036 Base + CD + Woodlands
Bradley Stoke Way West	0	0	8	4
Pear Tree Road	0	0	9	4
Bowsland Way	2	2	7	5
Bradley Stoke Way East	1	1	31	4
Brook Way	4	4	57	17

Impact		
Approach Name	AM	PM
Bradley Stoke Way West	0	-4
Pear Tree Road	0	-4
Bowsland Way	0	-2
Bradley Stoke Way East	0	-27
Brook Way	0	-40

Table 6.10: A38 / Hortham Lane Junction				
	AM Peak		PM Peak	
Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	2036 Base + CD	2036 Base + CD + Woodlands
A38 Gloucester Road South	14	22	84	122
A38 Gloucester Road North	293	382	300	275
Hortham Lane (Left)	18	70	4	10
Hortham Lane (Right)	17	70	3	10

Impact		
Approach Name	AM	PM
A38 Gloucester Road South	9	38
A38 Gloucester Road North	89	-25
Hortham Lane (Left)	52	7
Hortham Lane (Right)	53	7

Queue in Vehicles

5.75

Table 6.5: A38 / M5 Junction				
	AM Peak		PM Peak	
Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	2036 Base + CD	2036 Base + CD + Woodlands
A38 Gloucester Road North	34	28	76	79
M5 East	44	50	72	84
A38 Gloucester Road South	5	5	76	75
M5 West	10	18	57	47

Impact		
Approach Name	AM	PM
A38 Gloucester Road North	-6	3
M5 East	6	12
A38 Gloucester Road South	0	-1
M5 West	8	-9

Table 6.6: Aztec West Roundabout				
	AM Peak		PM Peak	
Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	2036 Base + CD	2036 Base + CD + Woodlands
A38 Gloucester Road North (Ahead/	54	51	2	2
A38 Gloucester Road North (Left)	6	8	2	2
Bradley Stoke Way	21	12	19	15
A38 Gloucester Road South	79	80	85	84
Park Avenue	1	1	35	31

Impact		
Approach Name	AM	PM
A38 Gloucester Road North (Ahe	-3	0
A38 Gloucester Road North (Lef	2	0
Bradley Stoke Way	-9	-4
A38 Gloucester Road South	1	0
Park Avenue	0	-3

Table 6.8 Woodlands Lane				
	AM Peak		PM Peak	
Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	2036 Base + CD	2036 Base + CD + Woodlands
Woodlands Lane (Right)	54	6	44	71
Woodlands Lane (Left)	28	0	33	71
Bradley Stoke Way East	4	3	32	17
Bradley Stoke Way West	2	2	4	3

Impact		
Approach Name	AM	PM
Woodlands Lane (Right)	-48	27
Woodlands Lane (Left)	-28	38
Bradley Stoke Way East	-1	-15
Bradley Stoke Way West	0	0

Table 6.9 Pear Tree / Bradley Stoke Way				
	AM Peak		PM Peak	
Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	2036 Base + CD	2036 Base + CD + Woodlands
Bradley Stoke Way West	0	0	1	1
Pear Tree Road	0	0	1	1
Bowsland Way	0	0	1	1
Bradley Stoke Way East	0	0	5	1
Brook Way	1	1	10	3

Impact		
Approach Name	AM	PM
Bradley Stoke Way West	0	-1
Pear Tree Road	0	-1
Bowsland Way	0	0
Bradley Stoke Way East	0	-5
Brook Way	0	-7

Table 6.10: A38 / Hortham Lane Junction				
	AM Peak		PM Peak	
Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	2036 Base + CD	2036 Base + CD + Woodlands
A38 Gloucester Road South	2	4	15	21
A38 Gloucester Road North	51	66	52	48
Hortham Lane (Left)	3	12	1	2
Hortham Lane (Right)	3	12	0	2

Impact		
Approach Name	AM	PM
A38 Gloucester Road South	1	7
A38 Gloucester Road North	16	-4
Hortham Lane (Left)	9	1
Hortham Lane (Right)	9	1

[redacted]

Land at Woodlands Golf Course
JSP Draft Site Allocations in Support of Development

Transport Study

January 2018

Broad Quay House, Prince Street, Bristol BS1 4DJ www.vectos.co.uk
Registered address: Vectos (South) Limited, Network Building, 97 Tottenham Court Road, London W1T 4TP. Company no. 7591661

REPORT CONTROL

Document:	Transport Study
Project:	Land at Woodlands Golf Course
Client:	[redacted]
Job Number:	162451
File Origin:	P:\Projects\160000\162451 - Woodland Golf Course\2. Text\1. Reports\Transport Assessment\162451_Transport Study_Final Draft.docx

Document Checking:

Primary Author	Dafydd Rees	**Initialled:**	DR
Contributor	Neil Brant	**Initialled:**	NB
Review By	Neil Brant	**Initialled:**	NB

Issue	Date	Status	Checked for Issue
1	27/07/2017	Draft Issue	NB
2	2/08/2017	Final Draft	NB
3	7/08/2017	Final Issue	NB
4	08/01/2018	Updated Version	NB

Contents

1 INTRODUCTION 1

2 EXISTING TRANSPORT CONDITIONS 3

3 DEVELOPMENT 16

4 SUSTAINABLE ACCESS STRATEGY 18

5 TRAFFIC GENERATION 25

6 TRAFFIC MODELLING 35

7 MITIGATION 50

8 COMPARATIVE ASSESSMENT OF DRAFT JSP SITES 52

9 POLICY 55

10 CONCLUSIONS 56

Figures

Figure 2.1: Site Location
Figure 2.2: Local Facilities
Figure 2.3: Walking Isochrone
Figure 2.4: Cycling Isochrone
Figure 4.1: SUSTRANS route strategy

Appendix

Appendix A: Indicative Scheme Layout
Appendix B: TRICS Outoput
Appendix C: Woodladns Trip Generation Methodology
Appendix D: Distribution
Appendix E: ARCADY Outputs
Appendix F: VISSIM modelling results
Appendix G: SUSTRANS Study

Drawings

162451-GA-01 Proposed Cycle / Foot Bridge Location
162451-PHL-05 Northern Access
162451-PHL-06 Southern Access
162451-PHL-09 Mitigation Scheme

1 INTRODUCTION

1.1 Vectos have been commissioned by [redacted] to prepare a Transport Study in support of a proposal to allocate land at the Woodlands Golf Club, South Gloucestershire. This proposal consists of a development of 2,000 dwellings, local centre, primary school and public open space.

1.2 The context within which Vectos has assessed the prospective development site, in isolation and in comparison, to other Draft allocations, is that of the planning policy aim of achieving sustainable development. This Study also includes extensive and detailed capacity assessments of the highway network to set out the traffic impact and mitigation strategy for the scheme.

1.3 The Draft JSP stresses the importance of sustainable access and the overall need to reduce the length of trips. In particular, the JSTS states at paragraph 52, that:

> ***Integrating housing and employment development with investment in reliable high quality transport choices will reduce the length and number of journeys to work, encouraging more sustainable travel modes such as cycling, walking and public transport and reduce the reliance on car based journeys.***

1.4 Paragraph 32 of the National Planning Policy Framework (NPPF), that the sets out the key elements that decisions should take account of, in relation to transport and plan making.

1.5 Paragraph 32 "Plans and decision should take account of whether":

> ***The opportunities for sustainable transport mode have been taken up depending on the nature and location of the site, to reduce the need for major transport infrastructure;***
>
> ***Safe and suitable access to the site can be achieved for all people; and***
>
> ***Improvements can be undertaken within the transport network that cost effectively limit the significant impacts of the development. Development should only be prevented or refused on transport grounds where the residual impacts of development are severe.***

1.6 In particular, this study will focus on how the Woodlands Garden Village development, given its proximity to the highest proportion of trip destinations of all the Draft allocated sites, will: significantly minimise the need to travel; significantly minimise the distance travelled; maximise the ability of residents to travel by sustainable means, and thereby result in the provision of the most cost effective transport infrastructure and services enabling the

provision of policy compliant levels of affordable housing on the site along with tangible community infrastructure improvements.

1.7 This study includes a detailed assessment of the traffic impact of the Woodlands scheme on the adjacent highway network. A comparative assessment of the traffic impact of the scheme has been undertaken against the Buckover site.

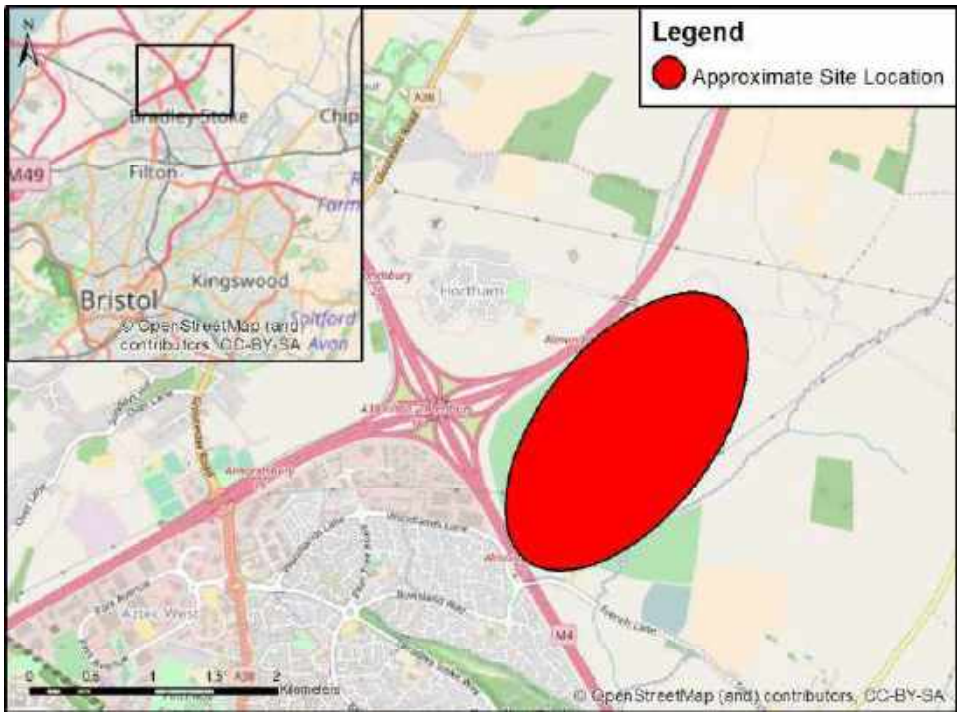
2 EXISTING TRANSPORT CONDITIONS

2.1 This chapter outlines the existing transport conditions, local highway network, highway safety, walking and cycling opportunities, and the facilities within easy distance, and public transport opportunities in no particular order.

Site Location

2.2 The proposed development is located in the north of Bristol, nestled in the eastern quadrant of the M4/M5 junction. The site location is shown in Figure 2.1 below.

Figure 2.1 – Site Location Plan



2.3 The site is bounded by Hortham Lane to the north, primarily farmland to the west, Trench Lane to the south, and the M4 and M5 to the west. The site is currently used as a golf course; in creating this the site was subject to the importation of inert fill material to create some of the landforms that are seen on site today.

2.4 There is presently one point of access to the development site from Trench Lane to the south. This is a vehicular access which services the golf club; it currently takes the form of a simple priority junction.

Existing Site Use

2.5 The proposed allocation of the Woodlands Garden Village site is located in the eastern quadrant that is formed by the M4 and M5 motorway Almondsbury interchange (Junctions 20/15). Figure 2.1 shows the location of the proposed development site.

2.6 The site is currently occupied by the following land uses:

- 2 x 18 Hole Golf Course;
- Fishing Lake;
- Conference and wedding facilities for up to 150 guests;
- Clubhouse and bar.

2.7 As part of the development of the site as a golf course the site was subject to engineering works to create the undulating landform and perimeter bunds that can be seen on-site today. These works would have frequently accommodated large HGV movements in and out of the site on a daily basis.

Local Highway Network

2.8 Trench Lane is a single carriageway road which operates two way traffic flows. Trench Lane connects the B4427 to the east with Woodlands Lane to the west. The road is currently subject to the national speed limit. A traffic survey was undertaken on this carriageway, the resultant traffic flows are shown below in Table 2.1.

Table 2.1 – Trench Lane traffic flows

Period	Westbound			Eastbound		
	Flow (vehicles)	Average Speed (mph)	85th %ile (mph)	Flow (vehicles)	Average Speed (mph)	85th %ile (mph)
AM peak (0800-0900)	609	32	36	167	33	38
PM Peak (1700-1800)	188	34	39	500	34	38

2.9 As can be seen from Table 2.1. above, Trench Lane experiences tidal traffic, with the dominant flow being to the west in the AM peak period, and to the east in the PM peak

period; this would be as expected due to the location of the employment in north Bristol. The west and east bound 85th percentile speeds in both the peak periods are below 40mph.

2.10 Once over the motorway, Trench Lane is subject to a 30mph speed limit, and is characterised by residential frontage, street lighting, footpaths primarily on either side of the carriageway.

2.11 Trench Lane connects to Woodlands Lane via a roundabout junction. Woodlands Lane connects to Bradley Stoke Way via a signalised junction.

2.12 Trench Lane, south of the roundabout junction with Woodlands Lane, terminates at a four armed roundabout, with Ormonds Close, Ellicks Close, and Bowsland Way. Ormonds Close and Ellicks Close are both residential areas. Bowsland Way connects with Bradley Stoke Way via a five arm roundabout, with Pear Tree Road, and Brook Way.

2.13 Bradley Stoke Way is a residential road, which benefits from street lighting, a shared footpath/cycleway, and typically, an active residential frontage. Bradley Stoke Way terminates at the Aztec West Roundabout, with the A38 and Aztec West. The junction of the A38 and M5 is immediately to the north of this roundabout.

2.14 To the east, Trench Lane is subject to a 60mph speed limit, and operates two way flows.

2.15 To the north of the development site, Hortham Lane runs in an east-west direction. A traffic survey was undertaken on this carriageway, the resultant traffic flows are shown below in Table 2.2.

Table 2.2 – Hortham Lane traffic flows

Period	Westbound			Eastbound		
	Flow (vehicles)	Average Speed (mph)	85th %ile (mph)	Flow (vehicles)	Average Speed (mph)	85th %ile (mph)
AM peak (0800-0900)	120	44	51	52	47	56
PM Peak (1700-1800)	64	47	55	96	49	58

2.16 As can be seen from Table 2.2 above, the eastbound traffic has a slightly higher average recorded speed compared to that of the westbound traffic. Again, there is a tidal traffic flow,

with the majority of vehicles traveling to the west in the AM period, and the majority traveling to the east in the PM period.

2.17 Hortham Lane is subject to the national speed limit, and operates two-way flows until Hortham village, whereby it is subject to a 30mph speed limit. Hortham Lane connects to the A38 via a signalised junction.

2.18 To the east, Gaunt's Earthcott Lane is a single carriageway, with passing places, and is subject to the national speed limit. Gaunt's Earthcott Lane terminates at a simple priority junction with Old Gloucester Road.

Pedestrian and Cycling

2.19 This section outlines the numerous facilities within easy walking and cycling distance of the proposed development. These facilities are graphically shown in Figure 2.2. Detailed Walking and Cycling Isochrone Plans are provided at Figures 2.3 and 2.4 respectively.

2.20 These are outlined below in Table 2.3, and form the basis for the desire lines identified in later sections.

Table 2.3 – Local Facility Table

Facility \ Service	Name of Facility	Distance	Walking time (mins)	Cycling time (mins)
Primary School	Bowsland Green Primary School	650m	8	2
	Holy Trinity Primary School	1.2km	14	5
Secondary School	Bradley Stoke Community School	1.6km	19	6
	Patchway Community College	2.5km	30	9
Local Centre	On Site	0	0	0
	Pear Tree Road Local Centre	1.4km	17	5
GP	Bradley Stoke Surgery	1.6km	19	6
Dentist	Bradley Stoke Dental Centre	1.5km	18	6
Convenience Store	On Site	0	0	0
	Pear Tree Road Local Centre	1.4km	17	5
Supermarket	Aldi	1.5km	18	6
	Tesco	1.6km	19	6
Retail	Willow Brook Centre	1.5km	18	6
	Cribbs Causeway	5.0km	60	19
Leisure	Bradley Stoke Leisure Centre	1.6km	19	6

	North Bristol RFC	2.9km	35	11
	Almondsbury UWE FC	3.2km	38	12
	Patchway	3.2km	38	12
Railway Station	Bristol Parkway	4.3km	51	16
Post Office	Pear Tree Road Local Centre	1.4km	17	5
Library	Bradley Stoke Library	1.6km	19	6

2.21 As can be seen from Table 2.3 above, there are a number of key facilities within easy walking and cycling distance of the proposed development. The location of these ensures the proposed development is inherently sustainable, as there is a tangible opportunity for a number of journeys to be made via sustainable means over the private car.

2.22 The desire lines to a number of these facilities and amenities have been assessed to identify any potential missing links or inadequacies.

2.23 The vast majority of facilities are located to the west of the proposed development, and require pedestrians and cyclists to cross Trench Lane over the M4. At present, there are no specific pedestrian or cyclist facilities along Trench Lane until the M4 bridge. Over the M4 bridge, there are footpaths on either side of the carriageway, although these have been effectively narrowed due to the introduction of safety barriers. This will be dealt with via the introduction of a pedestrian and cycle footbridge over the M4.

2.24 The vast majority of the desire lines are along residential areas which benefiting from street lighting, appropriate crossing facilities, and are typically overlooked. There are a number of cycle specific infrastructure located along the desire lines, from on-road cycle lanes, to shared cycle/footpaths. However, cycling infrastructure to key services and facilities will be improved as part of this scheme and which would provide wider sustainable travel benefits to the area.

Public Transport

2.25 This section outlines the numerous public transport opportunities located within close proximity to the proposed development.

Bus

2.26 The closest bus stop is presently located some 400m from the southern access, either on Trench Lane, or Woodlands Lane. The bus stops on Trench Lane benefit from shelters, bus timetable information, and street furniture, whilst the bus stops on Woodlands Lane benefit from a flag and pole arrangement.

2.27 Bus services 73, 963, S7C and X73 call at these stops, providing frequent and reliable services to Bristol Temple Meads, Bristol centre, Bradley Stoke and Cribbs Causeway. These services are summarised below in Table 2.4.

Table 2.4 – Bus summary table

Service	Route	Direction	First/Last	Frequency
73	Bristol Temple Meads – Bristol Centre – Filton Avenue – Bradley Stoke – Cribbs Causeway	Cribbs Causeway	0544/0151	4 per hour
		Bristol Temple Meads	0502/2355	
963	Winterbourne – Patchway	Patchway	1546	1 per day
		Winterbourne	0810	
S7C	Stoke Gifford – Marlwood School – Thornbury	Thornbury	0748	1 per day
		Stoke Gifford	1605	
X73	Bristol Centre – Patchway	Patchway	1708/1835	3 per day
		Bristol Centre	0645/0845	

2.28 As can be seen from Table 2.3 above, the primary service is the number 73, which operates extended hours, at a regular frequency. This is fortified by the X73 which provides direct trips to Bristol Centre. Two school bus services also call at the stop, providing daily services.

Metrobus

2.29 At present, the nearest metrobus stop is located adjacent to the Bradley Stoke Roundabout. This is located approximately 1.3km on road from the southern access of the proposed development site, however a pedestrian link between Ellicks Close and Bradley Stoke Way means that you can walk to the metrobus route within a distance of approximate 1km. Metrobus stops are to have a number of secure cycle parking facilities to encourage sustainable multimodal commuting. It is proposed that the metrobus will be approximately seven minutes quicker compared to conventional busses to the city centre (from Aztec West). The Metrobus service will operate with a greater reliability, with separate bus lanes for a large proportion of the journey allowing the services to avoid queuing traffic.

2.30 There is potential to introduce a bus service from the proposed development site to link up with the metrobus route as a minimum. As part of developing a sustainable access startgey for the site, we would investigate the further extension of the metrobus through the Woodlands Site and into Thornbury, providing wider benefits to the area. This will be explored fully at a later stage of the promotion process.

Rail

2.31 The two nearest railway stations to the proposed development are Patchway and Bristol Parkway, at 3.2km and 4.3km from the southern access point respectively. There are four cycle parking spaces at Patchway, and 156 cycle parking spaces at Bristol Parkway; this enables multimodal sustainable travel. A number of locations can be accessed from Patchway and Bristol Parkway, as outlined in Table 2.5 below.

Table 2.5 – Rail Summary Table

Originating Station	Destination	Duration	Frequency
Patchway	Bristol Temple Meads	13 minutes	Hourly
	Cardiff Central	48 minutes	Hourly
Bristol Parkway	Bristol Temple Meads	12 minutes	4 per hour
	Swindon	25 minutes	2 per hour

	Bath Spa	28 minutes	1 per hour
	Cardiff	40 minutes	2 per hour
	Taunton	45 minutes	1 per hour
	Reading	58 minutes	2 per hour
	Exeter St David's	1hr 12 minutes	1 per hour

2.32 As can be seen from Table 2.5 above, a wide range of locations can be accessed from the proposed development, within a reasonable commute time. It should be noted that only direct services have been shown, and that a number of destinations can be accessed more frequently if changes are made.

Site Assessment

2.33 The Draft JSP talks about the importance of sustainable access and the overall need to reduce the length of trips. As outlined within the Draft JSP:

Integrating housing and employment development with investment in reliable high quality transport choices will reduce the length and number of journeys to work, encouraging more sustainable travel modes such as cycling, walking and public transport and reduce the reliance on car based journeys.

2.34 We are of the opinion that the location of proposed residential and existing and proposed employment areas need to be linked to minimise the overall need and or the length of journeys and to maximise travel by sustainable modes.

Assessment

2.35 Detailed walking and cycling isochrones of 2k, 5km and 8km have been produced for each development site which represents appropriate walking and cycling distance. The isochrones follow the road network and cycle network, giving an accurate representation of the facilities within these distances compared to 'as the crow flies'. These isochrones have been overlaid onto census output areas; from this, the amount of employment within walking and cycling distances has been calculated. The amount of employment within the wards have been taken from the 2011 census. Whereby a ward is incorporated completely by an isochrone, all of the employment is assumed to be accessible. Whereby only part of the ward is accessible, the percentage of the jobs within the isochrone has been calculated using assumptions in

relation to mapping and aerial photography to best estimate where in the ward the employment is located.

2.36 Two assessments have been undertaken as part of this study; with and without the employment allocation as part of the JSP.

Without JSP Employment Allocation

2.37 Table 2.6 below summarises the number of existing jobs considered to be accessible to each site on foot and by bike. This is based on 2011 employment numbers and does not account for any additional employment to be delivered through the JSP.

Table 2.6: Job Numbers accessible from Woodlands

Draft JSP Site	Employment Numbers		
	25 Minute Walk	19 Minute Cycle	30 Minute Cycle
	2km	5km	8km
Woodlands	4,833 (1)	25,823 (1)	61,452 (1)
Thornbury	4,820 (2)	7,521 (4)	11,475 (5)
Yate	4,173 (3)	11,606 (3)	18,510 (3)
Coalpit Heath	2,878 (4)	12,465 (2)	59,134 (2)
Charfield	885 (5)	3,031 (6)	7,839 (6)
Buckover	66 (6)	6,502 (5)	12,581 (4)

2.38 As outlined in Table 2.6 above it is evident that the site at Woodlands performs best with regards to proximity, and thereby sustainable access on foot or by bike, to existing employment opportunities and would not be reliant on the delivery of JSP employment allocations to make them accessible to jobs via non-car modes.

2.39 There are more employment opportunities located within all three isochrones, 2km, 5km & 8km, from the Woodlands site when compared to all other candidate sites in, and to the north, of Bristol.

2.40 In fact, there is twice the number of jobs within the 5km isochrone of the Woodland site than any of the Draft JSP candidate site north of Bristol. Further, with the exception of the Coalpit Heath site there is over three times the number of jobs within 8km (commute cycle distance) of the Woodland site than any of the Draft JSP candidate site.

2.41 It is therefore evident that principle of development at Woodlands should be established on the basis that it offers a significant opportunity to maximise active travel (and sustainable travel given its proximity to the metrobus route) and far outperforms the other draft allocation sites. The baseline position of this site is significantly better than the draft JSP sites in terms of sustainable access and its potential to minimise car travel.

With JSP Employment Allocation

2.42 A further assessment has been undertaken which includes provision for the employment to be delivered through the JSP. There are a number of employment sites allocated within the JSP across the region:

- Avonmouth Severnside Enterprise Area (8,000 – 12,000 jobs)
- Filton Enterprise Area (6,000 jobs)
- Emersons Green Enterprise Area (6,000 jobs)
- Bristol Temple Quarter Enterprise Zone (6,000 jobs)

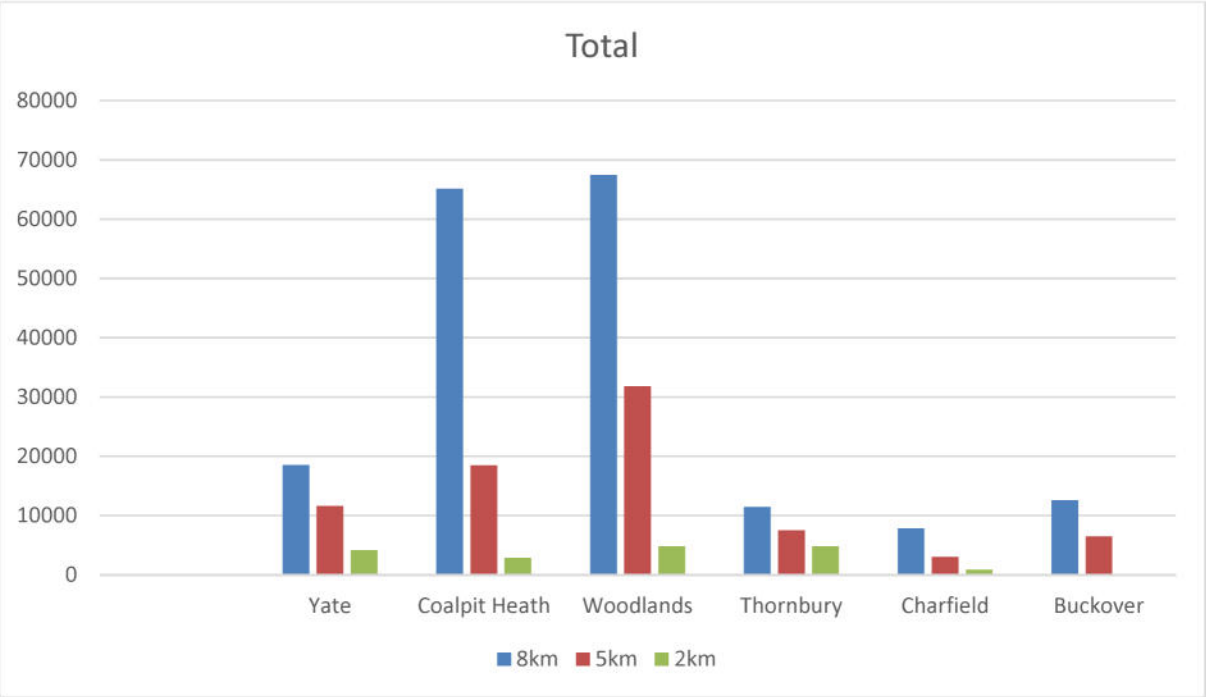
2.43 Table 2.7 below shows the number of existing and proposed jobs considered to be accessible to each proposal on foot and by bike.

Table 2.7: Job Numbers accessible from Draft JSP Sites Including Employment within JSP

Draft JSP Site	Employment Numbers		
	Walk	21 minute Cycle	30 Minute Cycle
	2km	5km	8km
Woodlands	4,833 (1)	31,823 (1)	67,452 (1)
Thornbury	4,820 (2)	7,521 (4)	11,475 (5)
Yate	4,173 (3)	11,606 (3)	18,510 (3)
Coalpit Heath	2,878 (4)	18,465 (2)	65,134 (2)
Charfield	885 (5)	3,031 (6)	7,839 (6)
Buckover	66 (6)	6,502 (5)	12,581 (4)

2.44 The above statistics are illustrated in Graph 1 Below, which clearly shows that Woodlands Garden Village outperforms all Draft allocated sites when it comes to its proximity to employment opportunities within walking and cycling distances.

Graph 1: Job Numbers accessible from Draft JSP sites



2.45 As can be seen from Table 2.7 above, there is a minimal impact upon the ranking of the development sites with respect to number of jobs available within walking and cycling distances. Woodlands and Coal Pit Heath can access an additional 6,000 jobs each over a 5km cycle, from Filton Enterprise area and Emersons Green Enterprise Area respectively.

2.46 What is evident from this table, is that the JSP candidate sites are not well located compared to existing and proposed employment areas. Other than the Coal Pit Heath Site (along with Woodlands), none of the JSP candidate sites are located within acceptable cycling distances of the proposed employment allocation. It appears that the location of the draft employment and residential allocation is disjointed and does not make the best use of existing or future infrastructure.

2.47 The only sites to benefit from being located within acceptable cycle distances from the proposed JSP employment sites is the Woodlands site along with the Coal Pit Heath.

Analysis

2.48 Table 2.8 below compares the percentage of jobs accessible on foot or by bike compared between the Woodlands site and the Draft JSP sites. It is evident that there are more jobs located within walking and cycling distance from the Woodland site than the Draft JSS sites. The analysis below incorporates the employment sites allocated within the JSP.

Table 2.8: Comparison of Woodland site with Draft JSP sites

Draft JSP Site	% of Jobs at Woodlands compared to Draft JSP Candidate sites.		
	25 minute walk	19 minute Cycle	30 Minute Cycle
	2km	5km	8km
Woodlands	100%	100%	100%
Thornbury	99.7%	29.1%	18.7%
Yate	86.3%	44.9%	30.1%
Coal Pit Heath	59.5%	48.3%	96.2%
Charfield	18.3%	11.7%	12.8%
Buckover	1.4%	25.2%	20.5%

2.49 It is therefore evident that the Woodland site offers a significantly better level of active travel connections to jobs than that of the Draft JSP candidate sites. When compared to the Buckover site the Woodlands site provides significantly more opportunities for sustainable travel and there is no comparison between them with Woodlands being far superior site in accessibility terms. As such as a baseline the Woodlands site has a far greater potential to deliver a sustainable and accessible development.

Conclusion

2.50 Based on the information presented above, it can be concluded that:

- The Woodlands site benefits from being located within walking and cycling distances of significant employment opportunities, which provides a number of jobs far in excess of the potential number of residents that it would accommodate;
- The Woodlands site has far higher levels of existing jobs within walk and cycle distances than any of the proposed allocation sites within the Draft JSP;
- Only the Woodland and Coal Pit Heath sites are located within walking and cycling distances of the proposed employment allocations within the Draft JSP;
- The Woodlands site has the greatest potential to maximise active Travel when compared to the Draft JSP sites;
- The Woodlands site has better potential for improved Public Transport links being located only 1km walk from the Metro Bus Route;

- Given the opportunities provided by the site for active travel we have partnered with Sustrans to develop a coherent cycling strategy (further discussed in chapter 4).

3 DEVELOPMENT

Scheme Description

3.1 The development proposal includes the construction of 2,000 dwellings, a two-form entry primary school, a 100 bed care home and ancillary retail and community uses.

3.2 An indicative scheme layout is shown at **Appendix A**.

Vehicular Access

3.3 The proposed scheme includes access points directly from Trench Lane and Hortham Lane and a spine road connecting the two site accesses. The design of the spine road would be in line with the requirements of Manual for Streets and will take into account the principles of placemaking and a street for all rather than an emphasis on the private car.

3.4 The spine road is likely to be designed as follows:

- 6.5m carriageway;
- 2m footway on either side of the road;
- 3m / 4m shared cycle way on one side of the road;
- Access Road to be designed on the basis of MfS principles.

Southern Access

3.5 It is proposed that the southern access to the site would be gained directly from Trench Lane via a roundabout. The design of the proposed main access is shown in drawing 162451_PHL_06. Detailed capacity assessment of the site access has been undertaken and shows that this form of junction operates well within capacity. Details of the modelling work are presented at section 6 of this report.

Northern Access

3.6 It is proposed that a northern access is provided from Hortham Lane to the north. This will take the form of a roundabout design as shown in drawing 162451_PHL_05.

3.7 Detailed capacity assessment of the site access has been undertaken which shows that the northern access operates well within capacity given the result of the capacity assessment it is

likely that a simple priority junction would also be appropriate as a northern access to the site. Details of the modelling work are presented in section 6 of this report.

4 SUSTAINABLE ACCESS STRATEGY

Introduction

4.1 This section of the report sets out the overall sustainable access strategy for the scheme. This has been considered in the context of the NPPF's defined aim that seeks to consider cost-effective measures. It should also be highlighted that the sustainable access strategy will not only benefit the Woodlands site but will also benefit the wider area and in particular Bradley Stoke which currently accommodates around 5,000 households (2011 Census).

4.2 Other regional cities, Cardiff for example, have a transport policy informing their LDP that seeks to address the travel impacts of development through both 'Carrot' and 'Stick' measures. In the case of Cardiff, the 'carrot' is an Infrastructure Delivery Plan which seeks to deliver local and corridor transport measures to facilitate sustainable and car based travel from development. The 'stick' is to provide only limited car based highway improvements so as to sustain travel times at a set benchmark level. i.e. to cap peak hour car travel at an acceptable level as opposed to a continued predict and provide strategy that may encourage excessive car use.

4.3 A similar balanced approach to infrastructure delivery at Woodlands meets the NPPF and JSP objectives of emphasising the importance of sustainable access. It has already been established (Chapter 2) that that the Woodlands site provides the greatest opportunity to maximise sustainable travel when assessed against the alternative allocations set out in the JSP and therefore it is considered appropriate that any transport mitigation associated with the Woodlands scheme should focus on providing sustainable access in the form of high quality cycle and pedestrian links and new bus provision linking into the metrobus, which provides access to significant employment, health, retail and education provision.

4.4 This sustainable access strategy is considered in the context of the existing sustainable access provision and infrastructure (i.e. short walking and cycling distance to key facilities along with high quality public transport provision in the form of Metrobus) within the vicinity of the site in additional to key trip attractors that are within appropriate walk / cycle or public transport distances from the site. The site is located in an excellent location to inherently benefit from existing opportunities for sustainable access. this includes:

- Proposed metrobus service routed along Bradley Stoke Way (some 1.3km from the site);
- Existing bus service provision that offers regular services to the main destinations in the local area and beyond
- The site is located within walking or cycling distances of key and extensive employment; retail; education, health and leisure provision as set out in chapter 2.

4.5 The purpose of the sustainable access strategy is to:

- Increase proportion of tips by active modes of travel and public transport;
- Reduce the proportion of trips by car;
- Promote mobility;
- Reduce greenhouse gas emissions by reducing car travel generally and trip lengths increasing travel by sustainable modes.

4.6 The sustainable access strategy will focus on connecting the Woodlands site with various trip destinations in the area. It should be noted that adjacent residential areas such as Bradley Stoke (around 5,000 dwellings) will naturally benefit from the sustainable access strategy, which would provide wider benefits in terms of reduced car travel not only from the Woodlands site but also from the existing residential properties in the area which will benefit equally from improved infrastructure.

Site layout

4.7 The current masterplan for the site and future detailed layouts will be developed with sustainable access high on the agenda. Provision will be made for direct and convenient pedestrian and cycling routes. The layout will also be developed so that it can accommodate buses which will form part of the sustainable access strategy for the site.

Public Transport

Metrobus

4.8 The Woodlands site is located some 1km walk distance from the planned metrobus route which would operate along Bradley Stoke Way. A 1km distance equates to an approximate 12 minute walk or a 4 minute cycle. All metrobus bus stops will benefit from cycle parking

facilities. Residents at Woodlands would have the choice of a 12 minute walk or a 4 minute cycle to the metrobus bus stop.

4.9 The Metrobus route provides a more reliable and quicker service when compared to standard bus services within Bristol. It also provides a journey time saving of 7 minutes between Aztec West and Bristol City Centre. Buses that operate along the metrobus will benefit from wifi and charging points for electronic devices.

4.10 The metrobus route is only 1.3km on road from the proposed site access and therefore the site is in an excellent location to utilise existing services and or to introduce / extend existing services into the Woodlands site. This accords with the requirement of the NPPF which would deliver a cost effective sustainable transport strategy by making best use of existing infrastructure.

4.11 None of the emerging JSP allocations are so well located to take advantage of both the existing Metrobus Route and the ability to tap into this with new services

4.12 The Metrobus infrastructure is already in place to enable this development to fully benefit from these improvements to public transport in the area. This would provide cost effective measures in terms of providing an excellent level of bus access from the site which accords with the requirements of the NPPF.

4.13 Public transport will be facilitated through a commitment for a bus service through the site providing bus links to key destinations. It is proposed that this would be a metrobus service subject to agreement of the provider and Council. This would accord with the vision of the overall metrobus offering in Bristol to include additional routes.

4.14 The on-site Spine Road will be built to an appropriate width to facilitate Metrobus services.

Conventional bus routes

4.15 The Woodlands scheme will seek to enhance existing bus service within the area, in particular the 77 route to the north of the site which connects Thornbury with Bristol City Centre.

Walking and Cycling

Cycling Infrastructure

4.16 SUSTRANS have been instructed and have developed a network of active travel routes servicing the development site which will focus on creating High Capacity Transport Network (HCTN) between the site and major trip destinations. Cycling provides a significant opportunity to replace car trips. SUSTRANS have advised that within Bristol, cycle use has increased 85% within an 8 year period from 2008 to 2015.

4.17 The proposed strategy is set out in Figure 4.1.

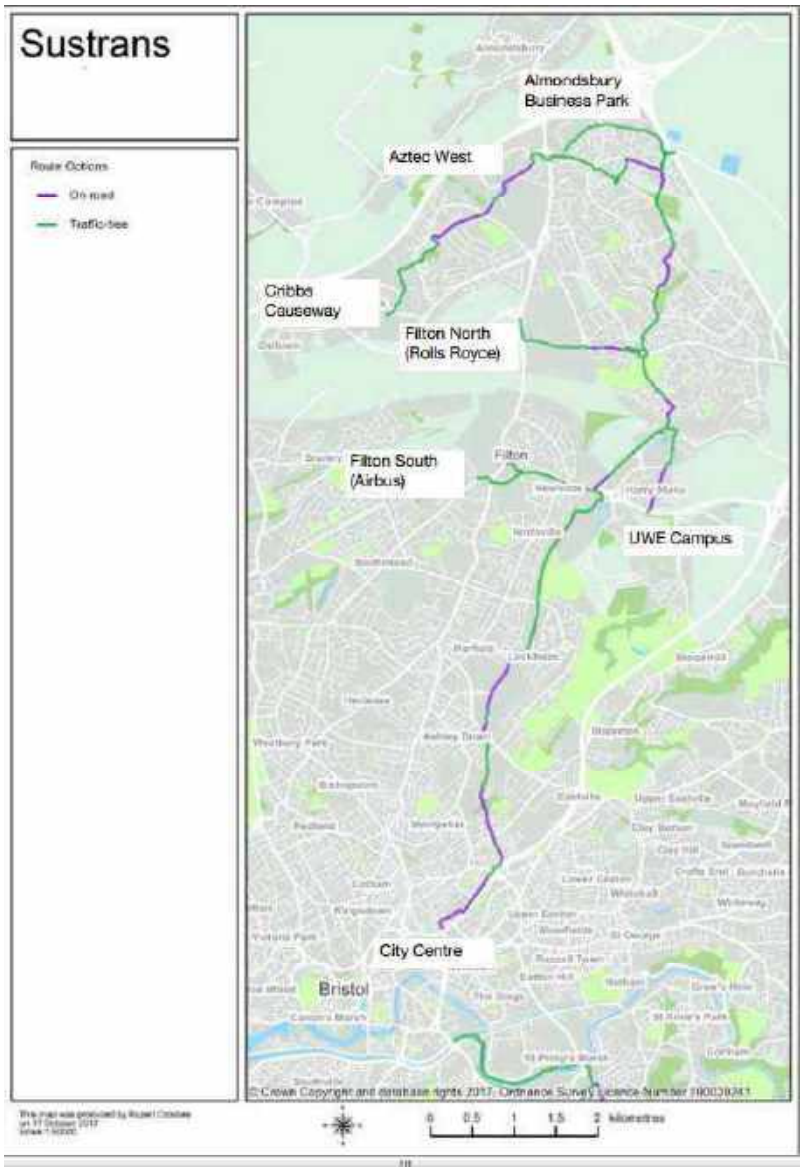


Figure 4.1: Proposed SUSTRANS routes

4.18 As advised by SUSTRANS, the Greater Bristol area has experienced steep increases in cycling usage over the last ten years, and there is widespread recognition of the contribution that good infrastructure serving active travel makes towards creating successful urban space and towards improving reducing congestion and improving air quality, public health and wellbeing. The consideration of cycling infrastructure at this early stage ensures that cycling provision is accounted for within the masterplan from the outset and guides the evolution of the masterplan to reduce car travel in favour of sustainable travel modes.

4.19 This scheme ensures that the development is accessible by all modes of travel and provides a real commitment for enhancing the accessibility of the site by sustainable modes of travel and by providing meaningful cycle infrastructure improvements. It is therefore evident that this scheme would fully embrace the benefits of active travel and promote the concept of mobility. The above scheme would not only benefit the future residents of Woodlands but also the areas adjacent to the cycle routes. This will provide a significant benefit to cycle routes in Bristol in general rather than localised benefits to the development only.

4.20 We have partnered with SUSTRANS to who have develop a coherent and appropriate cycling strategy for the site and includes the following routes:

- Aztec West
- Cribbs Causeway
- Filton / North Bristol Business Park / Rolls Royce
- MOD / UWE
- Bristol City Centre

4.21 The strategy outlines a series of measures to improve the identified routes to SUSTRANS standard cycle routs. The measures suggested are identified as Critical, Significant or Beneficial which are fully detailed within the SUSTRANS study at **Appendix G**.

4.22 These enhanced routes would provide the opportunity to maximise travel by bike, by providing choice and good quality infrastructure to enable cycling trips.

Cycle and foot Bridge

4.23 To complement the work already undertaken by SUSTRANS it is proposed that a new bridge parallel to Trench Lane bridge is provided and which would create new dedicated link for cyclist and pedestrians and which would provide a direct connection into the site.

4.24 An indicative scheme layout of the bridge is provided in drawing 162451-GA-01.

4.25 This would provide a segregated and direct pedestrian and cycle link between the site and Woodlands Lane.

Travel Planning

4.26 A detailed Travel Plan will be prepared for the site and which will promote sustainable travel along with the hard infrastructure measures set out above. The TP will also include a series of soft measures to promote sustainable travel and to outline the benefits of doing so.

Personalised Travel Planning

4.27 Personalised Travel Planning PTP has been proven to be an effective tool to promoting sustainable travel to embrace behavioural change with regards to travelling more sustainably. Research undertaken by SUSTRANS shows what the benefits of PTP are likely to be and as summarised in the table below. Given the sustainable transport measures proposed and the accessible nature of the site, there are no reasons as to why PTP at Woodlands could deliver a similar level of reduction in car travel. Further PTP work to encompass the wider area could be delivered to further promote sustainable travel and reduce congestion in the area. Table 4.1 sets out the impact of PTP on car travel in various locations across the country and there is no reason why Woodlands cannot deliver a similar level of benefit and reduction in car travel. The PTP work will be supported by a sustainable access strategy which could deliver even further discounts to car travel.

Table 4.1: PTP Impact on Car Travel

Location	Change in proportion of trips as car driver
St Albans	-12%
Hemel Hempstead	-2%
Cardiff	-12%

Ipswich	-11%
Broxbourne	-10%
Lowestoft	-13%
Exeter	-12%
Watford	-13%
Lancaster & Morecambe	-14%
Preston & South Ribble	-10%
Peterborough	-11%
Worcester	-10%
Gloucester	-13%

5 TRAFFIC GENERATION

Introduction

5.1 This section of the report sets out the traffic generation associated with the existing land uses on site and that associated with the proposed development. This is then used to forecast the net change in traffic associated with the site as a result of its development for residential led mixed uses.

5.2 The modelling assessment work which supports this Transport Study provides a comparative assessment between the woodlands site and other candidate sites. For the purpose of traffic impact this study focuses on the Buckover site and therefore the assumed traffic generation associated with this site is set out within this chapter.

5.3 A comparative assessment with the Buckover site has been undertaken as it is a large scale allocation divorced from any existing employment and key infrastructure. This combined with the analysis work undertaken in tables 2.6, 2.7 and 2.8 leads us to believe that this is the weakest candidate site in the current JSP. There are currently limited services and facilities in place to serve the Buckover site.

5.4 This chapter also sets out the assume distribution of the Woodlands and Buckover development traffic onto the adjacent highway network.

Woodlands Site Traffic

5.5 The Woodlands site has an existing land use and established traffic generation associated with it. As such we have set out below the traffic generation associated with the existing site operation and that associated with the proposed development.

Existing Site Traffic

5.6 The site is currently occupied by the following land use:

- 2 x 18 Hole Golf Course;
- Fishing Lake;
- Conference and wedding facilities for up to 150 guests;
- Clubhouse and bar.

5.7 It is envisaged that the majority of trips associated with the site on weekdays would be associated with the golf course and the conference facility and as such the traffic flows associated with these land uses have been calculated to set a baseline as to what the site could currently generate.

Golf Course

5.8 The TRICS database has been consulted to derive appropriate trip rates for an 18 hole golf club. Land use category 09 – Golf/B – Private 18 Hole Course has been used as this was the only land sues that provided weekday trip rates. The TRICS output files ae provided at **Appendix B** and Table 5.1 provides a summary of the forecast traffic generation associated with the golf course.

Table 5.1: Golf Course Traffic

Golf Course			
Period	**In**	**Out**	**Total**
0700 to 0800	66	2	68
0800 to 0900	14	14	28
0900 to 1000	6	48	54
1600 to 1700	6	6	12
1700 to 1800	4	6	10
1800 to 1900	10	14	24

Conference Facility

5.9 The conference facility has the capacity to accommodate up to 150 guests. The traffic generation figures for the conference facility are based on first principles and as follows:

- Assume guests would arrive for 0900 and depart after 1700
- Assumed that 72% of guests would drive as per the existing travel to work car mode share for the area.

5.10 Table 5.2 provides a summary of the traffic generation associated with the conference facility on site.

Table 5.2: Conference Facility Trip Generation Forecast

Conference Facility			
Period	**In**	**Out**	**Total**
0700 to 0800	0	0	0
0800 to 0900	108	0	108

0900 to 1000	0	0	0
1600 to 1700	0	0	0
1700 to 1800	0	108	108
1800 to 1900	0	0	0

Summary of Existing Site Traffic

5.11 Table 5.3 provides a summary of the likely traffic generation potential associated with the existing use of the site.

Table 5.3: Existing Site Traffic

Conference Facility			
Period	**In**	**Out**	**Total**
0700 to 0800	66	2	68
0800 to 0900	122	14	136
0900 to 1000	6	48	54
1600 to 1700	6	6	12
1700 to 1800	4	114	118
1800 to 1900	10	14	24

Proposed Development Traffic

Trip Generation

5.12 A detailed technical note is provided at **Appendix C** and which sets out the forecast external vehicular tip generation associated with the development which takes into account an element of trip containment with the complementary land uses proposed on site.

5.13 Table 5.4 provides a summary of the external trip generation associated with the development.

Table 5.4: Development Traffic

Development Traffic			
Period	**In**	**Out**	**Total**
0700 to 0800	106	395	500
0800 to 0900	166	567	733
0900 to 1000	216	270	486
1600 to 1700	440	245	685
1700 to 1800	544	312	856
1800 to 1900	382	265	647

Behaviour Change Interventions

5.14 It is important to consider Behaviour Change Interventions alongside infrastructure improvements to maximise the benefits of infrastructure on both existing and new residents. Personalised Travel Planning (PTP) programmes can be very effective in supporting modal change. PTP includes the appointment of travel advisors to assess individuals travel needs and to advise on the choices available for journeys. We see this as an important aspect of the sustainable access strategy so that future residents area aware of the options available.

5.15 Other local authorities in the area implement PTP and understand their values. Wiltshire Council states that:

Personal travel planning is a technique people use to consider their travel habits and choices. Within the UK, PTP programmes have been seen to reduce car driver trips typically by around 11% and reduced the distance travelled by car by 12%.

5.16 SUSTRANS have indicated that a recent site wide intervention in Cardiff engaged 85,000 households for a cost of around £400,000 (cost of less than £5 per dwelling). By raising peoples awareness of Sustainable Transport, the PTP project in Cardiff saw:

- 12% reduction in single occupancy car journeys;
- 13% increase in Public Transport Use;
- 21% increase in walking.

5.17 In light of the above and the PTP example sset out in Table PTP is considered an excellent and cost effective tool to promote sustainable travel especially given the infrastructure in place including the nearby metrobus route and pedestrians and cycling improvements. This accords with the requirements of the NPPF in that PTP cost effectively limits the impact of the development.

5.18 In light of the above and other examples in the UK (Table 4.1) of PT benefits a reduction of 12% has been applied to the external vehicular trip generation and the update trip generation forecast is outlined in table 5.5.

Table 5.5: Traffic Generation with Behaviour Change

Trip Generation with PTP			
Period	**In**	**Out**	**Total**

0700 to 0800	99	349	448
0800 to 0900	153	502	654
0900 to 1000	202	248	450
1600 to 1700	401	238	639
1700 to 1800	495	300	795
1800 to 1900	358	262	621

5.19 It should also be noted that there is no reason why PTP could not be rolled out across the area to provide wider trip discounts in respect to existing residents. The general area benefits from being located within active travel distances of significant employment, in addition to the metro bus route and walking and cycling improvements to be proposed as part of this development.

Net Traffic Impact

5.20 Table 5.6 provides a summary of the net traffic generation of the development in vehicular number terms. This sets out the increase in traffic associated with the site as a result of its development. This is calculated through the subtraction of existing site traffic from proposed site traffic.

Table 5.6: Net Traffic Impact

Net Traffic Generation			
Period	**In**	**Out**	**Total**
0700 to 0800	33	347	380
0800 to 0900	31	488	518
0900 to 1000	196	200	396
1600 to 1700	395	232	627
1700 to 1800	491	186	677
1800 to 1900	348	248	597

Buckover Site Traffic

5.21 The Draft JSP indicated that the Buckover site could deliver 2,200 dwellings. For the propose of providing a comparative assessment through detailed traffic modelling it is assumed that the Buckover site will deliver 2,000 dwellings along with a local centre and 2 form entry primary school. This enables a direct comparison between the two sites to be undertaken.

5.22 Because of its location remote from employment and social infrastructure the Buckover site will not benefit from the same opportunities for active travel and sustainable travel options

therefore it is assumed that the residential vehicular trip rate will be 10% higher than Woodlands. It is also assumed that the impact of behavioural change initiative will not be as effective as there are less opportunities for active travel and public transport usage and as such it is assumed that behavioural change could reduce car trips from the Buckover site by 8% rather than the 12% assumed within the Woodlands site. Public Transport provision is limited within Buckover, with the closest bus stop being located in Thornbury. The opportunities active travel are also limited as set out in Table 2.6, 2.7 and 2.8.

5.23 There is no discount associated with active travel and public transport enhancements (I.e. cycle routes / bus routes etc) as per the approach for the Woodlands site. The resultant vehicular trip generation forecast for the Buckover site is shown in Table 5.7 below.

Table 5.7: Buckover Traffic Generation Forecast

Net Traffic Generation			
Period	**In**	**Out**	**Total**
0700 to 0800	114	401	515
0800 to 0900	181	581	762
0900 to 1000	233	286	519
1600 to 1700	462	274	737
1700 to 1800	569	346	915
1800 to 1900	412	302	714

Comparison of Woodland and Buckover Traffic

Traffic Numbers

5.24 Table 5.8 provides a comparison between the traffic generation forecast associated with the Woodlands scheme against that associated with the Buckover scheme for an identical development schedule.

Table 5.8: Comparison of Woodland Site against Buckover in Traffic Terms

	Woodlands Traffic			Buckover Traffic			Net Change		
Period	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**
0700 to 0800	33	347	380	114	401	515	-81	-54	-135
0800 to 0900	31	488	518	181	581	762	-150	-93	-244
0900 to 1000	196	200	396	233	286	519	-37	-86	-123
1600 to 1700	395	232	627	462	274	737	-67	-42	-110
1700 to 1800	491	186	677	569	346	915	-78	-160	-238
1800 to 1900	348	248	597	412	302	714	-64	-54	-117

5.25 When comparing an identical developments impact at each of the Buckover and Woodlands sites then traffic associated with the Woodlands site would be around 23% lower. This is as a result of the location of the Woodlands site which is located in a more accessible location and provides more opportunities for active travel and which provides a greater focus on mobility. This will enable residents to have choice of travel mode and will not need to be reliant on owning a car to gain access to employment, education, retail, health and leisure uses.

5.26 The development of the Woodlands site would accord with the requirements of the NPPF in that it would plan for new development in a location which would reduce greenhouse gas emissions and allow cost effective infrastructure improvements to be provided which harness the presence of existing infrastructure rather than solely creating new infrastructure. Further analysis of the impact of the development with regards to greenhouse gases is set out below.

Green House Gas Emissions

5.27 An assessment of the impact of the scheme on greenhouse gas emission between the Woodlands and Buckover sites are set out below. The following parameters have been used for this assessment:

- Assumed average journey distance for Woodlands is 15.03km and 16.04km for Buckover as per data obtained from the 2011 Census;
- Assumed 124.8gramms of Co2 produced per km travelled by car (DfT Table VEH0150).

5.28 Table 5.9 provides a summary of the impact of the Woodlands and Buckover in terms of Co2 impact.

Table 5.9: Co2 Impact

	Woodlands			Buckover			Comparsion of Woodlands V Bukcover		
	Traffic	Distance	Co2 (Grams)	Traffic	Distance	Co2 (Grams)	Traffic	Distance	Co2 (Grams)
0700 to 0800	380	6091	760207	515	8776	1095195	-135	-2684	-334988

0800 to 0900	518	8304	1036282	762	12984	1620463	-244	-4681	-584181
0900 to 1000	396	6348	792215	519	8844	1103701	-123	-2496	-311486
1600 to 1700	627	10051	1254341	737	12558	1567298	-110	-2508	-312957
1700 to 1800	677	10852	1354368	915	15592	1945832	-238	-4739	-591463
1800 to 1900	597	9570	1194325	714	12167	1518387	-117	-2597	-324062
Total	3195	51216	6391738	4162	70920	8850876	-967	-19705	-2459138

5.29 As shown in table 5.9, the woodlands scheme would generate nearly 2 and a half million grams (2.5 tonnes) less of Co2 gases than the Buckover development over the 3 hour AM and PM peak period.

Distribution

Woodlands Site

5.30 Vehicular trips have been distributed onto the wider highway network in accordance to Travel to Work data, as obtained from the 2011 National Census for areas E02003098 and E02003101, which were deemed to be most representative of the proposed development. These Census areas cover Bradley Stoke and its is expected that the distribution of traffic from the Woodlands scheme would be similar to that of Bradley Stoke. The location of these output area are shown in **Appendix D**. these areas generally cover Bradley Stoke and we believe that the distribution of traffic associated with the Woodlands site would be similar.

5.31 The routes to each output area has been chosen based on local knowledge, and route planning software. These routes are then assigned an outer zone for the extend of the modelling assessment (i.e trips to Zone I will be travelling to / from M5 north or M4 east or west. The zones identified are shown below in Figure 5.1.



Figure 5.1: Distribution

5.32 In order to determine the appropriate route, Census data has been used to understand where people work and an appropriate routing is therefore determined. These routings are then assigned an origin / destination note (as set out in Figure 5.1) which covers the extent of the modelling work. For example trips to Wales, Gloucester or and Swindon will be assigned node I.

5.33 The resultant distribution is shown below in Table 5.10, and the full distribution data is shown in **Appendix D**. It should however be noted that detailed analysis of the traffic impact of the development has been undertaken within VISSIM which would assume its own routing to the zones identified on the above plan. The distribution of traffic associated with the Buckover scheme has been undertaken for the same zones as set out in Figure 5.1, however the travel to work data is based on Census data for the Buckover Ward.

Table 5.10 - Distribution

Destination	Woodlands	Buckover
A	0.0%	0.0%
B	20.3%	20.3%
C	0.0%	0.0%
D	0.0%	0.0%
E	3.4%	3.4%
F	9.4%	9.4%
G	8.3%	8.3%
H	18.4%	18.4%
I	32.1%	32.1%
J	0.0%	0.0%
K	8.0%	8.0%

6 TRAFFIC MODELLING

Introduction

6.1 This chapter considers the traffic impact of the development proposal. At the higher level modelling work undertaken does not account for any modal shift benefits associated with committed sustainable transport schemes (such as Metrobus) or any modal shift aspirations associated with the Joint Spatial Plan and Joint Transport Study.

6.2 Also, at a more local and site specific level, this work does not account for a reduction in car travel associated with a sustainable access strategy which is currently being developed. The sustainable access strategy will result in a reduction in car travel associated with the Woodlands Scheme, and will also have a wider discount in car travel associated with the existing urban area of Bradley Stoke.

Assessment Scenarios

6.3 The modelling assessment work will consider the following assessment Scenarios.

2017 Base Model

6.4 This model run will demonstrate how the adjacent road network currently operates. Base flows were collected in June 2017 and therefore does not account for any reduction in car trips on the network as a result of the implementation of the Metrobus service.

6.5 Whilst it is accepted that there are road works in place in the area during the time of undertaking the traffic surveys, the assessment work is considered appropriate to provide a comparative assessment of the impact of the Woodlands Scheme. Furthermore, a robust growth factors have been applied to the 2017 base flows to forecast 2036 flows which equate to a 15% increase in baseline traffic data. The growth factors account for all new households up t 2036 and therefore at this stage is an appropriate method of ensuring g a cumulative assessment of the JSP is undertaken.

2036 Base Model

6.6 This model run will consider the operation of the adjacent road network in a forecast year of 2036 without the Woodlands site. Tempro growth factor have been used to forecast what traffic could be in a forecast year of 2036. Whilst this may not account for growth associated

with the JSP sites, it does provide a robust basis to assess the impact of the development and how the impact would relate to the Buckover site.

2036 Base Model + Development (With and without Spine Road through site)

6.7 This model run will consider the operation of the adjacent road network in a forecast year of 2036 with the presence of traffic associated with the Woodlands Development. It will also assume that a spine road will be provided through the site (as shown on the emerging master plan) within the site which connects Trench Lane with Hortham Lane. An assessment without the Spine Road has also been undertaken so that we can fully understand the impact of the provision of a spine road connecting Trench Lane with Hortham Lane.

2036 Base Model + Buckover Development

6.8 This model run will consider the operation of the adjacent (adjacent to the Woodlands site) highway network in a forecast year of 2036 with the presence of the Buckover development in place. This will enable a comparison to be made between the traffic impact of the Woodlands development against the Buckover development. This scenario does not include traffic associated with the Woodlands development.

6.9 The extent of the study area considers the impacts local to the Woodlands site and does not consider the traffic impacts local to the Buckover site.

Assessment modelling technique

Site Access Junctions

6.10 Detailed capacity assessments of the site access junction has been undertaken using stand along junction modelling techniques such as a PICADY and ARCADY model.

Off-site traffic impacts

6.11 A detailed traffic impact assessment of the development has been undertaken using the VISSIM microsimulation computer programme.

Assessment Periods

6.12 The detailed VISSIM modelling work has been undertaken to support this scheme and as such the traffic generation forecasts have been calculated for the modelling periods as set out below:

- AM Peak (0800 to 0900); and
- PM Peak (1700 to 1800).

6.13 The assessment work has been undertaken for a forecast year of 2036 which reflects the extent of the timeframe of the JSP. The assessment of the site accesses has been undertaken for the AM (0800 to 0900) and PM (1700 to 1800) peak hours as the effect of the development on the network will be at its greatest during these times.

Traffic Generation

6.14 The traffic generation forecast associated with the development is set out in chapter 6. For the purpose of assessing the traffic impact of the development, we have used the total traffic generation associated with the development as set out in Table 6.5, rather than the net change in traffic. This presents a robust basis for assessment.

6.15 The traffic generation forecast also does not account for discounts associated with the sustainable access strategy. Therefore it models a worst case scenario.

Site Access Capacity Assessments

6.16 The assessment of the southern and northern accesses have been undertaken on the basis of:

- 2036 baseline flows
- Development traffic plus the re-distribution of existing flows through the site (this is taken from the VISSIM model);
- Distribution of traffic at the site accesses calculated as per the distribution set out in Table 10.

6.17 The VISSIM model has distributed development traffic onto the road network based on routing, journey times and delays.

6.18 The VISSIM model assumes the following vehicles numbers travelling through the northern and southern accesses. This include development traffic along with vehicles re-routing through the site:

- Southern Access:
  - AM Peak: 157 In /461 out
  - PM Peak: 571 in / 376 out
  - Assumed distribution of 20% to the east and 80% to the west
- Northern Access:
  - AM Peak: 186 In / 359out
  - PM Peak: 296 in / 336 out
  - Assumed distribution of 100% to the west

6.19 The modelling result present the operation of the junction in delay values, queue length and the Ratio of Flow to Capacity (RFC).

Southern Access Capacity Assessment

6.20 Table 6.1 provides a summary of the detailed modelling work undertaken for the southern site access with the modelling output files provided at **Appendix E**. The detailed modelling work has been undertaken for a forecast year of 2036 which represents the lifespan of the JSP. For the purpose of a robust assessment, it is assumed that all development traffic would be routed through the southern access, whilst the likely proportion would be 65% during the ANM peak hour and 71% during the PM peak hour. The model also makes an allowance for the re-distribution of existing traffic on the network through the site. This is taken from the VISSIM model.

Table 6.1: Southern Access Capacity Assessment

	2036 + Woodlands Development					
	AM (0800 to 0900)			PM (1700 to 1800)		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
Southern Access	0.5	3.83	0.35	0.5	4.68	0.35
Trench Lane East	2.3	10.18	0.71	0.4	4.16	0.30
Trench Lane West	0.4	3.08	0.28	2.6	8.32	0.73

6.21 As shown in Table 6.1, the proposed southern access junction operates well within capacity in a forecast year of 2036 with the presence of development traffic on the network. On the basis of all development traffic being routed through the site access, the junction would operate with a level of reserve capacity in the region of 29% during the AM peak and 27% during the PM peak.

Northern Site Access

6.22 Table 6.2 provides a summary of the detailed modelling work undertaken for the northern site access with the modelling output files provided at **Appendix E**. The detailed modelling work has been undertaken for a forecast year of 2036 which represents the lifespan of the JSP.

Table 6.2: Northern Access Capacity Assessment

	2036 + Woodlands Development					
	AM (0800 to 0900)			PM (1700 to 1800)		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
Hortham Lane	0.1	3.06	0.11	0.1	3.07	0.06
Northern Access	0.5	4.99	0.35	0.5	4.58	0.32
Hortham Lane	0.4	4.81	0.27	0.8	6.3	0.44

6.23 As shown in Table 6.2, the proposed northern access junction operates well within capacity in a forecast year of 2036 with the presence of development traffic on the network. On the basis of all development traffic being routed through the site access, the junction would operate with a level of reserve capacity in the region of 65% during the AM peak and 54% during the PM peak.

Off Site Traffic Impact

6.24 The VISSIM microsimulation modelling software has been used to assess the traffic impact of the development. Full modelling outputs are provided at **Appendix F**. The extent of the study area is shown in Figure 6.1 below and focuses on a section of the highway network that does experience congestion. It is envisaged that impacts on other part of the network would be minimal.



Figure 6.1: VISSIM Model Extent

Network Performance

6.25 Table 6.3 provides a summary of the traffic impact of the development of the Woodlands Scheme and that of the Buckover scheme. The network performance results presented in Table 6.3, is prior to the implementation of any mitigation measures to represent a worst case scenario.

Table 6.3: Network Performance prior to highway infrastructure

Average Delay Per Vehicle (Seconds)					
	2017 Base	2036 Base	2036 + Buckover	2036 + Woodlands (No Spine Road)	2036 + Woodlands (With spine Road)
AM Peak (0800 to 0900)	106	159	186	240	175
PM Peak (1700 to 1800)	71	169	297	236	220

6.26 As shown in Table 6.3, the proposed development (with the Spine Road) would result in an additional 16 seconds delay across the modelled road network during the AM peak hour and an increase of 51 seconds during the PM peak hour when compared to the baseline position in 2036. This level of additional delay would be experienced across the whole network and not simply at individual junctions. This level of delay is therefore not considered to be severe, especially in the context of the delivery of 2,000 dwellings. These results are in a theoretical and non-mitigated scenario. The level of impact is not severe as the scheme

includes a spine road linking Hortham Lane with Trench Lane and therefore allows for the re-assignment of some traffic away from the Aztec West Roundabout.

6.27 The inclusion of a spine road through the site provides a net benefit in delay of around 65 seconds during the AM peak hour and up to 16 seconds during the PM peak hour when compared to the no spine road scenario.

6.28 When compared to the baseline conditions in 2036 with the Buckover scheme traffic on the network, then the Woodlands development would result in 11 fewer seconds of delay during the AM peak hour and 68 fewer seconds of delay during the PM peak hour. In light of the above the Woodlands scheme would have less of an impact along the Almondsbury Interchange area when compared to the Buckover scheme. Therefore, it is likely that the level of infrastructure required to mitigate the impact of the Buckover scheme would be significantly more than that required to mitigate the impact of the Woodlands Scheme.

6.29 Further analysis of the impacts are considered below in the context of overall journey times and queue lengths at junctions.

Journey Time Impact

6.30 An assessment of the impact of the scheme (including the spine road) on journey times has been undertaken within the VISSIM assessment. The results are shown in Table 6.4.

Table 6.4: Journey Time Impact (Seconds per Vehicle)

	AM Peak		PM Peak		Comments
Route	V Base	V Buckover	V Base	V Buckover	
Route 1 Bradley Stoke Way to A38 North of M5 (NB)	-1	-9	-79	-192	
Route 2 Bradley Stoke Way to A38 North of M5 (SB)	-42	-91	+181	-144	Increase in journey is experienced on the A38 Southbound approach to the M5 J16 Junction
Route 3	+39	+38	+41	-2	

Woodlands Lane to A38 South (EB)					Increase in Journey time is experienced along Woodlands Lane
Route 4 Woodlands Lane to A38 South (WB)	+181	+173	+0	-11	

Route 1

6.31 Route 1 includes the following section of road:

- Westbound along Bradley Stoke Road Way towards the Aztec West Roundabout;
- Northbound from Aztec West Junction towards M5 J16;
- Northbound through the A38 / M5 J16 junction;
- Northbound along A38 north of the A38 / M5 J16 junction.

6.32 The proposed development will have a positive impact on Route 1 as set out above. Journey times along this route would be lower with the Woodlands scheme in place when compared to no development in place at the Woodlands site. Journey times would be significantly less than compared to the Buckover site along this route. When compared to the base situation in 2036 the journey time would be 1 seconds quicker in the AM peak and 9 seconds quicker in the PM peak. When compared to the with Buckover traffic scenario then the journey time would be 79 seconds quicker during the AM peak and 192 seconds quicker in the PM peak.

Route 2

6.33 Route 2 includes the following section of road:

- Southbound along A38 north of the A38 / M5 J16 junction
- Southbound through the A38 / M5 J16 junction to the Aztec West Junction;
- Eastbound along Bradley Stoke Road Way;

6.34 The Woodlands scheme would have a positive impact on this section of road during the AM peak hour with reduced journey time of 42 seconds when compared to the 2036 Base situation and a reduction of 91 seconds when compared to the 2036 Base situation with the presence of Buckover traffic on the network. During the PM peak hour the Woodlands

scheme would increase journey times along this section of road by 181 seconds when compared to the base situation in 2036. The increase in journey time will predominantly be experienced at the A38 southbound approach to the M5 J16. However, when compared to the 2036 plus Buckover traffic scenario, then the Woodlands scheme would result in a journey time saving of 144 seconds along this route. The development of the Woodlands site would have a significantly lower level of impact along this route when compared to the Buckover development.

6.35 Notwithstanding the above, it is expected that the Woodlands scheme would contribute towards a wider mitigation strategy for the M5 J16 / A38 Junction. However, a mitigation scheme for this junction could include the inclusion of an additional entry lane at the A38 northbound approach to the junction and amendments to the southbound approach to include 3 lanes which are signal controlled and a 4th lane which will function as a bypass lane and will merge the A38 with Mt Jct 16 eastbound on slip. Details of such a scheme as outlined in drawings 162451-PHL-05.

Route 3

6.36 Route 3 includes the following section of roads:

- Northbound along the A38 towards the Aztec West roundabout;
- Eastbound along Bradley Stoke Way and then onto Woodlands Lane

6.37 The impact of the Woodland scheme on Journey times along this route is small increase during the AM peak hour. The increase in journey time is experienced along Woodlands Lane, which is to be expected given the proximity of this local road to the development site. It is envisaged that investment in sustainable travel including the metrobus, improved cycle and walking access would minimise the increase in journey tome and mitigate this impact.

6.38 During the PM peak period there is no material impact on queueing.

Route 4

6.39 Route 4 includes the following section of roads:

- Westbound along Woodlands Lane and then Westbound Bradley Stoke Way towards the Aztec West Roundabout;

- Southbound along the A38 from the Aztec West Roundabout.

6.40 The development of the Woodlands site is likely to increase journey time along this route during the AM peak by 181 seconds when compared to the 2036 base scenario, the increase is 173 seconds when compared to the with Buckover traffic scenario. An increase along this route is expected given its proximity to the proposed development site.

6.41 The Woodlands traffic generation forecast is robust and does not represent the net change in traffic associated with the site, therefore the assumed Woodlands traffic overestimates traffic by around 136 vehicle movements during the AM peak hour and 118 vehicles over the PM Peak hour. In other words the assessment has not removed the existing site traffic from the network. The assessment work also does not account for any reduction in base traffic as a result of committed schemes such as the Bristol metrobus.

6.42 A robust sustainable access strategy is being developed for the site, which would not only provide a reduction in car travel from the development, but also the residential area of Bradley Stoke which includes around 5000 households. As such the Sustainable Access Strategy would reduce the level of delay experienced along Woodlands Lane.

6.43 It should also be noted that the modelling work does not account for drivers altering the time of travel to before or after the traditional peak hours as modelled. If drivers considered the level of delay to be excessive then they could simply change their travel time to before or after the traditional peak hours.

6.44 It is therefore considered that a more refined assessment would demonstrate a reduced level of delay along Woodlands Lane.

6.45 During the PM peak hour the Woodlands site would have no impact on journey times by around when compared to the 2036 base scenario, however when compared to the 2036 with Buckover development, then the journey time would be 11 seconds less.

Impact of Queuing Vehicles

6.46 This section of the report considers the impact of the Woodlands scheme on queuing vehicles. The VISSIM model report queuing in meters (**Appendix F**) and these have been converted to vehicles within this report by dividing the length of a queue by 5.75 which is the average length of a vehicle.

A38 / M5

6.47 Table 6.5 provides a summary of the impact of the Woodlands scheme on the A38 / M5 junction.

Table 6.5: A38 / M5 Junction

	AM Peak			PM Peak		
Approach Name	**2036 Base**	**Avg Queue Length Development comparison to 2036 Base**	**Avg Queue Length Development comparison to 2036 Base + Buckover**	**2036 Base**	**Avg Queue Length Development comparison to 2036 Base**	**Avg Queue Length Development comparison to 2036 Base + Buckover**
A38 Gloucester Road North	34	-2	-7	36	27	-16
M5 East	72	6	5	24	32	-18
A38 Gloucester Road South	5	0	0	74	-3	-3
M5 West	37	-1	-7	11	4	-19

6.48 Prior to the implementation of any mitigation measures the traffic impact of the development at the M5 / A38 junction is set out in Table 6.5. The level of impact is considered negligible during the AM peak hour and generally provides an improvement when compared to how the junction would operate with the presence of traffic associated with the Buckover development on the network.

6.49 During the PM peak hour the impact will be nominal at the A38 Gloucester Road South and the M5 West arms of the junction. The development is expected to increase queuing by 27 vehicles at the A38 Gloucester Road approach and 32 vehicles at the M5 westbound approach. When compared to the impact of the Buckover scheme the Woodlands scheme would result in less queuing.

6.50 It is envisaged that a cumulative scheme for junction improvements would be proposed for this junction and the Woodlands scheme would provide a significant contribution towards such a scheme.

Aztec West Roundabout

Table 6.6: Aztec West Roundabout

	AM Peak	PM Peak

Approach Name	2036 Base	Avg Queue Length Development comparison to 2036 Base	Avg Queue Length Development comparison to 2036 Base + Buckover	2036 Base	Avg Queue Length Development comparison to 2036 Base	Avg Queue Length Development comparison to 2036 Base + Buckover
A38 Gloucester Road North (Ahead/Right)	53	-3	-1	3	2	2
A38 Gloucester Road North (Left)	3	0	-9	3	2	3
Bradley Stoke Way	23	-2	-1	13	-3	-7
A38 Gloucester Road South	77	1	0	84	0	-1
Park Avenue	1	0	0	34	2	-1

6.51 As shown in Table 6.6 the impact of the development on the Aztec West Roundabout is negligible during both the AM and PM peak hours. There are no significant changes to the overall level of queuing at the junction. Further analysis of the journey times confirmed that there are no material impacts to delay at the junction. A summary of the changes in delay are set out in Table 6.7.

Table 6.7: Delay at Aztec West Junction

	AM Peak		PM Peak	
Approach Name	V Base	Vs Buckover	V Base	Vs Buckover
A38 Gloucester Road North	0	0	-4	+2
Bradley Stoke Way	3	0	-4	-13
A38 Gloucester Road South	5	-1	-24	-27

6.52 As set out in Table 6.7, the Woodlands Scheme has a minimal impact on delay at the Aztec West junction, however, provides a significant improvement when compared to the impact of the Buckover scheme.

Woodlands Lane Junction

6.53 Table 6.8 provides a summary of the impact of the Woodlands scheme on queuing at the Woodlands Lane / Bradley Stoke Way junction.

Table 6.8 Woodlands Lane		
	AM Peak	PM Peak

Approach Name	2036 Base	Avg Queue Length Development comparison to 2036 Base	Avg Queue Length Development comparison to 2036 Base + Buckover	2036 Base	Avg Queue Length Development comparison to 2036 Base	Avg Queue Length Development comparison to 2036 Base + Buckover
Woodlands Lane (Right)	16	11	9	17	-4	-3
Woodlands Lane (Left)	2	12	8	5	0	0
Bradley Stoke Way East	20	2	-1	12	-7	-19
Bradley Stoke Way West	2	0	0	8	-2	2

6.54 The modelling work shows there to be no material impact on journey time along Woodland Lane during the PM peak hour and is supported by the positive impact on queue lengths as set out above.

6.55 During the AM peak hour the scheme is expected to result in delay westbound along Woodlands Lane and this is confirmed by an increase in queuing of around 12 vehicles, which is not considered excessive.

6.56 Whilst Woodlands Lane is expected to experience an increase in queue lengths and delay during the AM peak hour, this level of impact needs to be considered in the context of Woodlands scheme tip generation which has been overestimated; on the basis that the baseline traffic numbers do not account for any reduction associated with the Metrobus scheme; the fact that no discount to car travel has been accounted for as a result of the sustainable access strategy which would also benefit the wider area in terms of reduced car travel; and the fact that the woodlands traffic generation has been overestimated as it does into account the traffic generation associated with the site exiting use which will be removed.

6.57 It is therefore considered at this stage, the above provides the confidence that whilst there will inevitably be an increase in queuing and delay along Woodlands Lane, a comprehensive sustainable access strategy and a more refined traffic generation forecast would minimise delay and queuing along Woodlands Lane to negligible levels. The increase in delay should also be considered on balance with the PM scenario where there is no material change when compared to the 2036 baseline scenario, and a significant reduction when compared to the 2036 with Buckover traffic scenario.

Pear Tree / Bradley Stoke Way Junction

6.58 Table 6.9 provides summary of the impact of the Woodlands scheme on the Pear Tree junction.

Table 6.9 Pear Tree / Bradley Stoke Way

	AM Peak			PM Peak		
Approach Name	2036 Base	Avg Queue Length Development comparison to 2036 Base	Avg Queue Length Development comparison to 2036 Base + Buckover	2036 Base	Avg Queue Length Development comparison to 2036 Base	Avg Queue Length Development comparison to 2036 Base + Buckover
Bradley Stoke Way West	0	0	0	2	0	1
Pear Tree Road	0	0	0	2	3	3
Bowsland Way	0	1	1	3	1	2
Bradley Stoke Way East	0	1	1	1	0	-1
Brook Way	5	5	2	5	0	-4

6.59 The Woodlands scheme is likely to have a negligible impact on the operation of the Pear Tree Junction in terms of queue lengths.

A38 Hortham Lane

6.60 Table 6.10 provides summary of the impact of the Woodlands scheme on the Pear Tree junction.

Table 6.10: A38 / Hortham Lane Junction

	AM Peak			PM Peak		
Approach Name	2036 Base	Avg Queue Length Development comparison to 2036 Base	Avg Queue Length Development comparison to 2036 Base + Buckover	2036 Base	Avg Queue Length Development comparison to 2036 Base	Avg Queue Length Development comparison to 2036 Base + Buckover
A38 Gloucester Road South	3	0	0	9	-1	-6
A38 Gloucester Road North	31	-2	-24	7	-2	-46
Hortham Lane (Left)	2	9	7	1	2	2
Hortham Lane (Right)	2	9	7	0	3	3

6.61 The Woodlands scheme is likely to have a negligible impact on the operation of the Hortham Lane Junction in terms of queue lengths.

Impact on Hortham Lane

6.62 It is accepted that as the site includes a spine road connecting Trench Lane with Hortham Lane, then a more detailed review of the impact on Hortham Lane needed to be undertaken.

6.63 Table 6.11 provides a summary of the impact of the proposed development on Hortham Lane in traffic terms.

Table 6.11: Impact on Hortham Lane

Direction	2036 Base		2036 Base + Woodlands	
	AM	PM	AM	PM
E/B	127	262	235	443
W/B	320	152	579	378
Two Way	447	415	814	821
Veh Per Minute	7.5	6.9	13.6	13.7

6.64 The redevelopment of the Woodlands site would increase traffic along Hortham Lane by around 367 vehicles during the AM peak hour and around 406 vehicles during the PM peak hour. This increase would be associated with the Woodlands site traffic along with the re-routing of some vehicles from other parts of the network. Whilst Hortham Lane is likely to experience an increase in traffic, the road is sufficiently designed to accommodate this level of traffic in terms of width and function.

6.65 As per the standards set out in the DMRB, a road of this standard could accommodate 1,250 vehicles per hour, with a maximum directional flow of 750 vehicles. The forecast level of traffic along Hortham Lane falls well below the capacity threshold of this type of road.

7 MITIGATION

Introduction

7.1 It is proposed that any impact associated with the development is mitigated through a robust sustainable access strategy. The site is located in an excellent location to maximise trips by active travel modes and public transport. It can be concluded that the site already benefits from excellent sustainable access credentials, however, further sustainable measures will significantly improve access in the area. This will not only benefit the Woodlands site with reduced demand and need to travel by car but it will also benefit the wider area which includes 5,000 dwellings at Bradley Stoke.

7.2 Whilst our approach is to limit highway schemes and to promote a truly accessibly scheme, a set of potential highway improvements options been developed to demonstrate how the scheme could potentially be mitigated in traffic capacity terms. This is shown on drawing 162451-PHL-09. We are of the opinion that any highway schemes to the M5 J16 / A38 junction would be delivered as part of the JSP to cumulatively mitigate the impact of the delivery of JSP sites and that the Woodlands site would provide a contribution towards this.

7.3 The highway schemes could include:

- Additional approach lane to the A38 northbound approach to the M5 / A38 Junction;
- additional entry lane at the A38 northbound approach to the junction and amendments to the southbound approach to include 3 lanes which are signal controlled and a 4th lane which will function as a bypass lane and will merge the A38 with Mt Jct 16 eastbound on slip;
- Reinstatement of nearside Lane (northbound) along the M5 between J16 and J15 as per a previous road layout of the M5.

7.4 It should be noted that the delivery of the Woodlands site is not reliant on the implementation of the above highway schemes, however these are identified as potential options that could be implemented. We envisage that any significant highway schemes would be delivered as part of the JSP with the Woodlands scheme contributing toward this.

Table 7.1 provides a summary of the impact of the Woodlands Scheme following the implementation of the above mitigation schemes.

Table 7.1: With Mitigation Results

Average Delay Par vehicle (Seconds)				
	2036 Base	2036 + Buckover	2036 + Woodlands (With spine Road)	2036 + Woodlands (With spine Road) + Mitigation
AM Peak (0800 to 0900)	159	186	175	164.1
PM Peak (1700 to 1800)	169	297	220	129.9

7.5 As shown in Table 7.1, the implementation of highway schemes mitigates impact of the development during the AM peak, and provides a significant betterment in the PM peak when compared to the 2036 baseline scenario. However, it should be noted that this development is not reliant on these schemes and these have been identified as potential schemes that could be delivered. Any highway scheme to the M5 / A38 junction is likely to be delivered as part of a wider improvement scheme that the Woodlands site would contribute towards.

8 COMPARATIVE ASSESSMENT OF DRAFT JSP SITES

Buckover

8.1 Buckover, in the context of a new Garden Village of 2,200 dwellings, is incredibly poorly related to existing trip destinations, such as employment and retail facilities and therefore from the outset will generate the need for travel way beyond better located sites such as Woodlands Garden Village. The scheme is of insufficient size to sustain an extensive employment allocation that would redress this significant issue, nor would such an allocation be commercially viable as it would directly compete with Aztec West which is one of the premier employment hubs of the region.

8.2 Located c10km to the north of Bristol all significant key trip destinations would be beyond sustainable active travel lengths (of up to 8kms). A feeder service to Metrobus, with a route length of c10km before making the connection at Almondsbury, would result in significantly extended and thereby unattractive journey times to most key trip destinations. The resulting effects would be a car dependant development placing greater and unnecessary burden on the existing highway network, notably including the Strategic Road Network (SRN) whereby joining the M5 at junction 14 and leaving at junction 16 would be a key route. Junction 14 is a substantially sub-standard junction configuration unable to accommodate any great increase in use without massive reconstruction whilst junction 16 has tidal capacity issues at peak times.

8.3 Detailed modelling of the impacts of the Woodland and Buckover sites confirm that the impact of the former is materially less than the latter within the locality of the Almondsbury interchange as shown in Figure 6.1. The Woodlands scheme would result in lower journey times within the modelled area of around 9 seconds during the AM peak period and 57 seconds during the Peak period.

8.4 The Woodlands site has the potential to have a far greater impact on increasing trips by sustainable modes of travel given the level of jobs within active travel distance of the site and therefore provides a far better baseline situation to work from when compared to the Buckover site. A robust sustainable access strategy is currently being developed for the Woodlands scheme and this would not only benefit the scheme itself but the neighbouring residential areas including Bradley Stoke which accommodates around 5,000 households.

8.5 The benefits of the sustainable access strategy is therefore likely to be significantly more effective in reducing the reliance on car travel when compared to the Buckover site. However the conclusion that Woodlands represents the best site is not reliant on this assumption, it simply reinforces this.

Charfield

8.6 The suggestion that strategic development of up to 1,000 dwellings at Charfield could support a business case to re-open the village train station is in our view unrealistic. The business case for a new station at Cranbrook, east of Exeter was triggered by 3,400 dwellings and the overall viability of that station in the long term achieved by the provision of 8,000+ dwellings.

8.7 As with Buckover, the proximity to north Bristol, at c17km, precludes any material level of sustainable and active travel and journey times by bus would be quite unattractive thereby placing an unnecessary burden on the highway network including the SRN at junctions 14 and 16.

8.8 The Charfiled site would not be able to deliver a level of sustainable travel as what could be delivered by Woodlands scheme. As shown in Tables 2.6, 2.7 and 2.8, the level of employment opportunities within walking distance of the Charfield site is significantly less than the Woodlands scheme.

8.9 The level of traffic generation and length of car trips associated with any development at Charfield is likely to be higher per dwelling that that to be delivered at Woodlands.

8.10 The benefits of the Woodlands sustainable access strategy is therefore likely to be significantly more effective in reducing the reliance on car travel when compared to the Charfield site. However, the conclusion that Woodlands represents the best site is not reliant on this assumption, it simply reinforces this.

Thornbury

8.11 Whilst Thornbury has a modest degree of local employment this is not to a sufficient level so as to self-contain travel to any significant degree and thereby the location is dependent on employment in north Bristol, 11km or greater away. North Bristol and its employment opportunities are beyond the reasonable cycling commute distance and as such public

transport and/or private car are the only viable alternatives. The JSPTS concedes that travel from Thornbury to local rail stations are lengthy and only viable by private car and it has to thereby be questioned whether the site can achieve any meaningful sustainable connectivity to Bristol. Combined with Charfield, it is suggested that development at Thornbury would facilitate a P&R facility on the A38 and thereby concedes the need to off-set traffic impact, from a car dependant location, by means of 'skimming' existing traffic off the network.

8.12 It is clear that development at Charfield, Thornbury and Buckover will result in car dependant schemes whereby a large proportion of that car travel is to employment and other trip destinations in north Bristol, and thereby via Junction 16 following the current tidal characteristics of morning in-commute and evening out-commute. The resulting impacts on junction 16 would be that of worsening the already significant congestion, delay and CO2 emissions, clearly contrary to the core principles of the JSPTS and NPPF.

9 POLICY

National Planning Policy Framework

9.1 The National Planning Policy Framework (NPPF) was published in March 2012 and sets out the Government's planning policies for England. Paragraph 17 of NPPF details 12 core land-use planning principles that should underpin both plan-making and decision taking.

9.2 Section 4 of NPPF details key transport policy requirements and the redevelopment of the Woodlands Golf Course site accords with the following requirements of the NPPF in transport terms.

9.3 Paragraph 30 of the NPPF states:

In preparing Local Plans, local planning authorities should therefore support a pattern of development which, where reasonable to do so, facilitates the use of sustainable modes of transport.

9.4 The redevelopment of the Woodlands Golf course site fully accords with the above requirement of the NPPF. The location of the site will facilitate the use of sustainable modes of Travel. The scheme can:

- Connect into the Bristol Metrobus System;
- Deliver improvements to cycling infrastructure in the area and have partnered with SUSTRANS to set out cycling strategy for the site ;
- Minimal traffic impact;
- Has the potential to enhance sustainable access in the wider area.

9.5 We would contend that the current draft allocations referred to in the previous section would not comply with this policy aim as they are located a significant distance from employment opportunities and extensive leisure and retail facilities. Therefore they would lead to an overreliance on car borne travel and will require the provision of significant new transport infrastructure as they cannot enhance existing services to a level that would adequately mitigate their impacts.

10 CONCLUSIONS

Summary

10.1 Vectos have been commissioned by [redacted] to prepare a Transport Study in support of a development on land at the Woodlands Golf Club, South Gloucestershire. This proposal consists of a development of 2,000 dwellings, local centre, primary school, care home and public open space.

10.2 The context within which Vectos has assessed the prospective development site, in isolation and in comparison, to other Draft allocations, is that of the planning policy aim of achieving sustainable development and maximise the use of sustainable modes of travel. This Study also includes detailed capacity assessments of the adjacent highway network to set out the traffic impact and mitigation strategy for the scheme. The study also includes a comparative assessment between the delivery of the Woodlands site against the draft JSP site in Buckover.

Sustainable Access

10.3 The Woodlands site is located in an excellent location to encourage and to maximise travel by active modes (walking and cycling) of travel and by public transport. When compared to all Draft JSP sites within the vicinity of the site (Table 2.8), the Woodlands scheme provides the greatest opportunity to maximise non-car trips. There are more employment opportunities located within a 2km (walk) or a 5km or 8km cycle than any of the local JSP sites as set out in Chapter 2 of the Transport Study. The Woodlands site is also located within close proximity of the Phase 1 metrobus route which provides a high quality public transport route Between Aztec West and Bristol City Centre. The site therefore already has an excellent level of access by sustainable modes.

10.4 The Draft JSP talks about the importance of sustainable access and the overall need to reduce the length of trips. As outlined within the Draft JSP:

Integrating housing and employment development with investment in reliable high quality transport choices will reduce the length and number of journeys to work, encouraging more sustainable travel modes such as cycling, walking and public transport and reduce the reliance on car based journeys.

10.5 The Woodlands site meets the above requirements and has the potential to fulfil this required more than the other Draft JSP sites within the area (Table 2.8) and in particular the Buckover site. Our calculations shows that there are around 4,833 jobs within walking distance of the Woodlands site, whilst this number is only 66 for Buckover. Similarly, the number of jobs within an approximate 8km cycle ride from Woodlands is 67,452, whilst the number for Buckover is substantially lower at 12,581.

10.6 The Woodlands scheme would make best use of its existing accessibility credentials and the availability of high quality public transport infrastructure, including Metrobus, to develop a comprehensive and robust sustainable access strategy to maximise the potential for sustainable travel whilst minimising trips by car. A detailed sustainable access strategy is being developed and the measures would include:

- Public Transport improvements and make best use of the metrobus route which operates adjacent to the site. we are currently in discussions with a national bus operator with regards to a bus access strategy for the site;
- Working in partnership with SUSTRANS who have developed a coherent and appropriate cycling strategy;
- Provision of a dedicated foot and cycle bridge adjacent to the trench Lane Bridge over the M4;
- Travel Planning; and
- Personalised Travel Planning.

10.7 The above measures would not only benefit the Woodlands scheme but also would provide a wider benefit to residents at Bradley Stoke where around 5,000 households are located. This would provide a wider benefit in increasing trips by sustainable modes in the area whilst minimising trips by car. This would provide a cost effective measures to reducing car travel in the area as the wider population would benefit from the access strategy and not only the Woodlands site itself.

10.8 The alternative draft allocations in the JSP, and in particular the Buckover site, does not offer the ability to provide significant wider benefits to exiting residents such as this.

10.9 The vehicular access strategy for the site includes an access onto Trench Lane and Hortham Lane with a Spine Road connecting the two accesses.

10.10 Detailed modelling of the scheme shows that (prior to any form of mitigation) the overall impact on the modelled network is minimal with an increase in journey times of around 16 seconds during the AM peak and 51 seconds during the morning peak as a result of the Woodlands scheme in 2036. This is not considered severe in the context of the delivery of 2,000 dwellings. However, the Woodlands site would have a lesser impact on journey times across the network when compared to the Buckover scheme. The Buckover scheme would have a longer journey time across the network by 65 seconds during the AM peak hour and 16 seconds during the PM peak hour when compared to the Woodlands site. The road network within the vicinity of the Almondsbury Interchange would therefore operate better with the Woodlands scheme in place than with the Buckover scheme in place.

10.11 Prior to the implementation of mitigation measures the development will largely have a negligible impact on the road network with no impact reported at the Aztec West Junction. The scheme is likely to have the following impacts:

- Increase in queueing and delay at the A38 / M5 Junction during the PM peak when compared to the 2036 base scenario. However, the impact of the Woodlands site would be lower than the Buckover scheme;
- Increase in queuing and delay along Woodlands Lane during the AM peak hour.

10.12 The traffic generation forecast associated with the Woodlands site has been overestimated by around 136 vehicle trips during the AM peak hour and by around 118 trips during the PM peak hour and therefore provides a robust basis for assessment.

10.13 It is considered that further refinement of the development traffic forecast which has overestimate development traffic along with the sustainable access strategy would result in reduced queuing and delay at the above locations. The sustainable access strategy would not only reduce car traffic associated with the Woodlands site but also the wider area. Our approach is to firmly mitigate the impact of the development through measures to improve sustainable access and not through significant highway schemes.

10.14 Notwithstanding the above, the following highway schemes could be provided:

- Additional approach lane to the A38 northbound approach to the M5 / A38 Junction;

- additional entry lane at the A38 northbound approach to the junction and amendments to the southbound approach to include 3 lanes which are signal controlled and a 4th lane which will function as a bypass lane and will merge the A38 with Mt Jct 16 eastbound on slip;
- Reinstatement of nearside Lane along the M5 between J16 and J15 as per the previous road layout.

10.15 It should be noted that the delivery of the Woodlands site is not reliant on the implementation of the above highway schemes, however these are identified as potential options that could be implemented. The above schemes would mitigate the impact during the AM peak hour and provide an overall betterment during the PM peak hour.

10.16 In Summary:

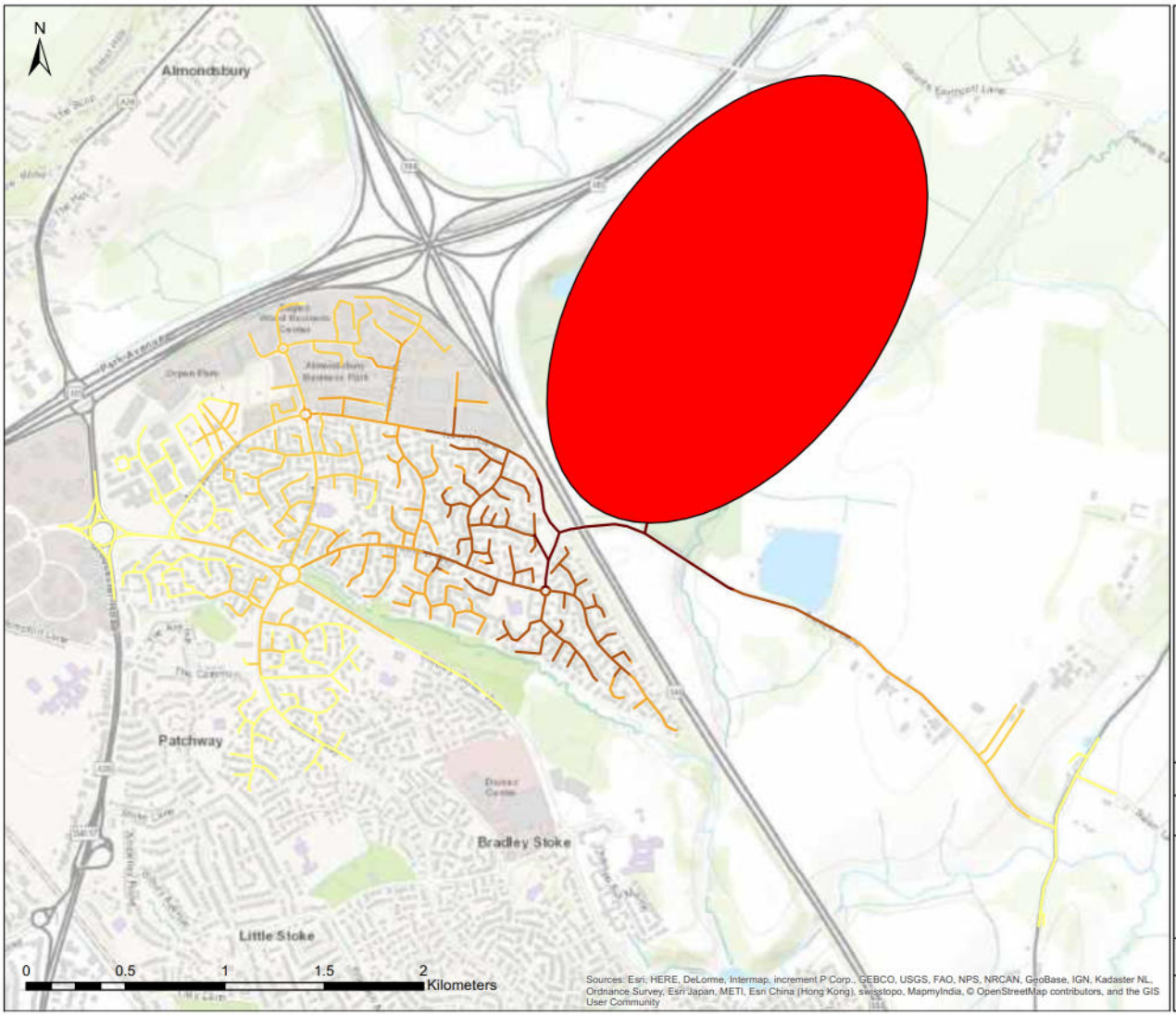
- Woodlands is located in an inherently highly accessible location and provides a significant opportunity to maximise travel by sustainable modes of travel and reduce the proportion of trips by car;
- The site is well located to make best use of committed sustainable travel infrastructure such as Metrobus and if possible improve this service;
- The overall traffic impact of the Woodlands scheme is not severe;
- The overall traffic impact of the Woodlands scheme is significantly less than that of the Buckover scheme on the road network.

Conclusion

10.17 This report provides the evidence to support the promotion of the Woodlands site as part of the JSP. The site accords with national policy and provides a truly sustainable development, which would make best use of existing sustainable infrastructure and would have a limited impact on the operation of the highway network.

10.18 The scheme will have less of a traffic impact that competing sites, in particular Buckover, whilst also providing a greater opportunity to facilitate sustainable travel.

FIGURES



Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Legend

Site Location

Walking Isochrone

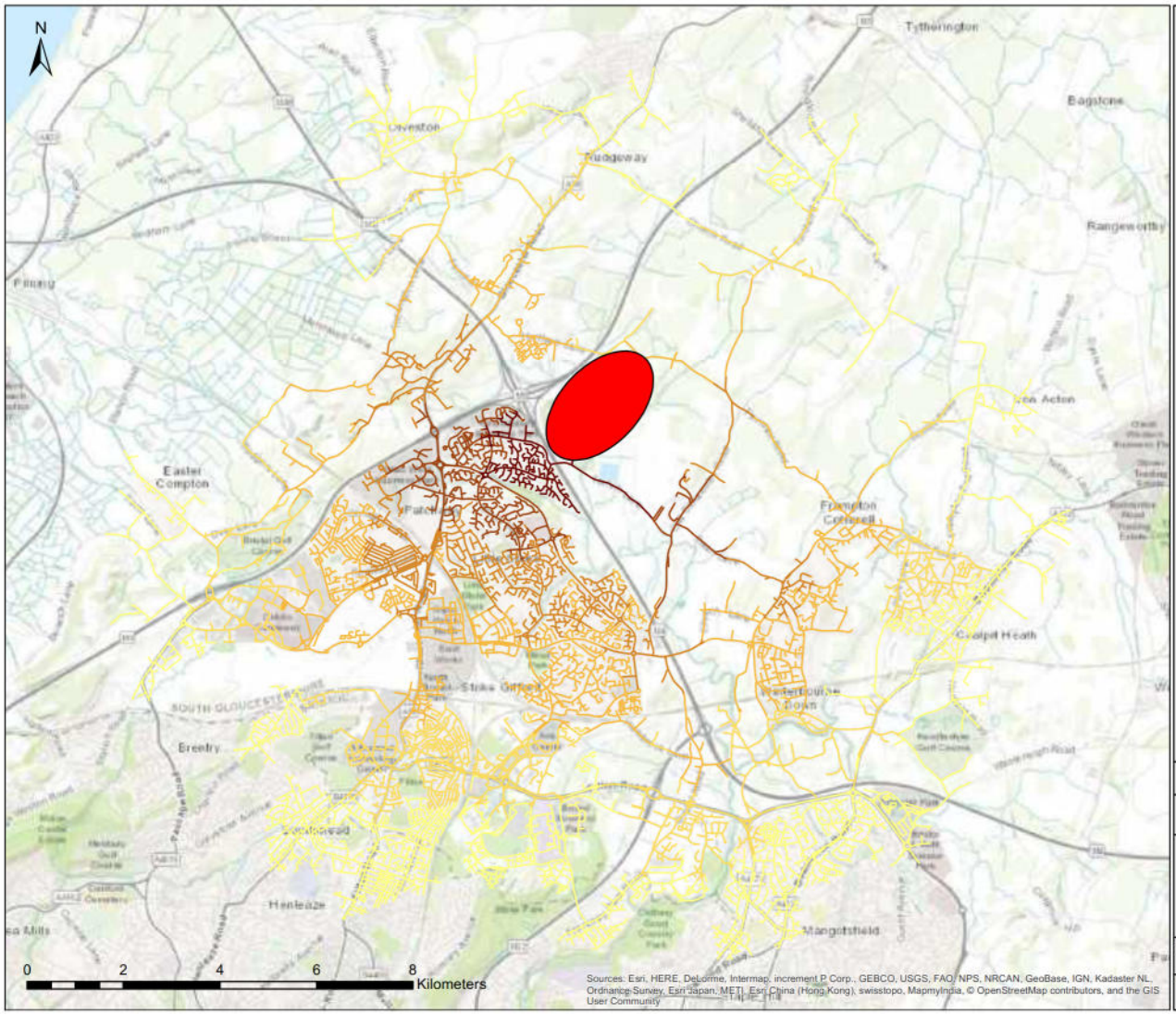
- 0 - 5 mins (0 - 400m)
- 5 - 10 mins (400 - 800m)
- 10 - 15 mins (800 - 1200m)
- 15 - 20 mins (1200 - 1600m)
- 20 - 25 mins (1600 - 2000m)

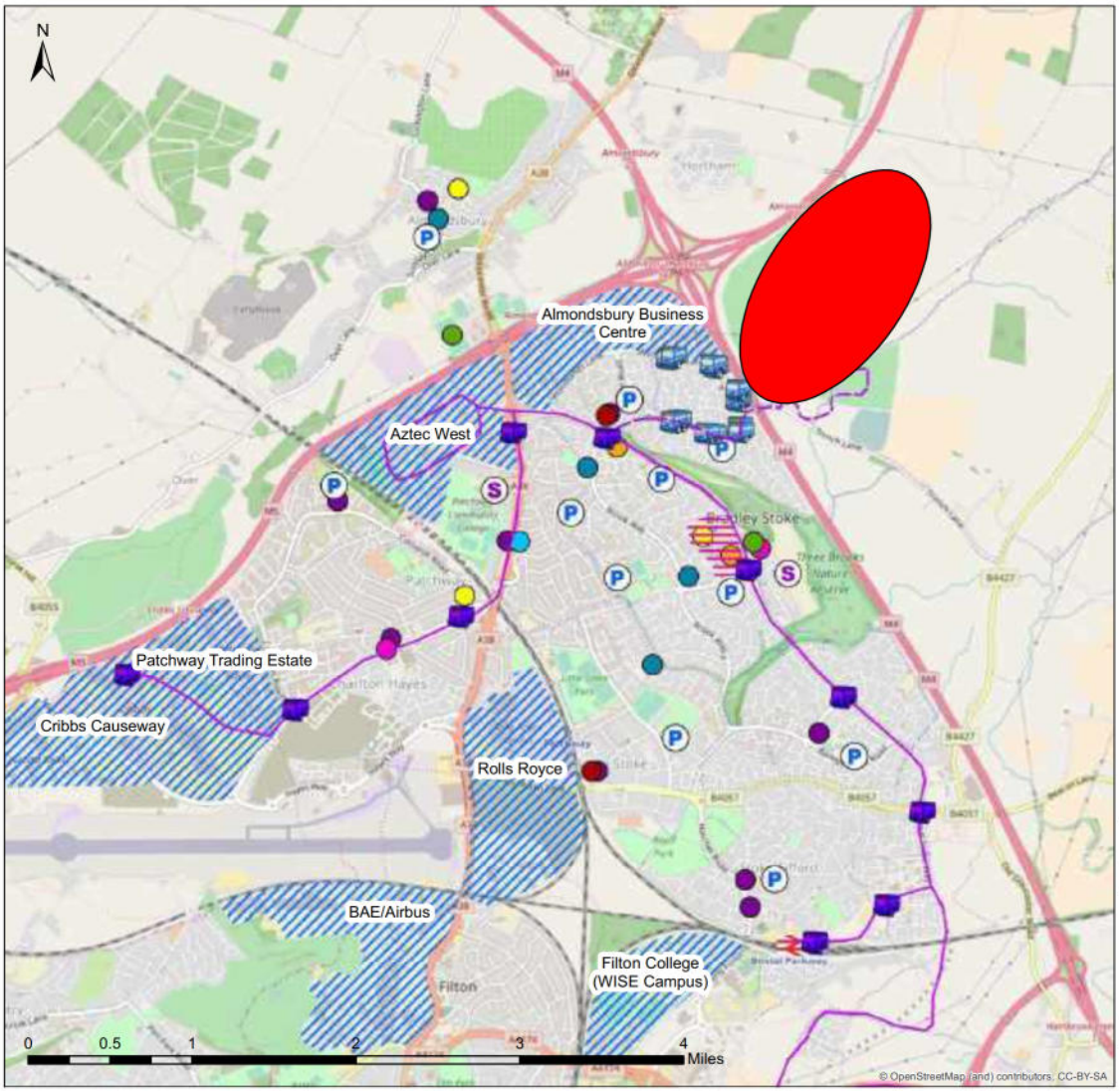
Woodlands Golf Course

Walking Isochrone

vectos

FIGURE:		
2.3		
DRAWN BY: SG	CHECKED BY: DR	DATE: 02/08/2017


N
Tytherington
Bagstone
Olveston
Tockington
Rangeworthy
Patchway
Easter Compton
Frampton Cotterell
Coalpit Heath
Stoke Gifford
Bradley Stoke
Bradley Stoke Town
Winterbourne
Winterbourne Down
Almondsbury
Pilning
Severn Beach
Aust
Thornbury
Alveston
Charfield
Wotton-under-Edge
Yate
Chipping Sodbury
Iron Acton
Westerleigh
Henleaze
Mangotsfield
Downend
Filton
Cribbs Causeway
Hambrook
Frenchay
Stoke Lodge
Golf Course
Golf Centre
Golf Club
Golf Course
Golf Course
Golf Course



Legend

- Site Location
- Bus Stop
- Railway Station
- Leisure Centre
- Bank
- Post Office
- Willow Brook Centre
- Library
- Primary School
- Secondary School
- GP
- Supermarket
- Convenience Store
- Dentist
- Metrobus
- Metrobus Stop
- Metrobus (Potential Route into Woodlands Garden Village)
- Employment Including:

Tesco Extra, Poundstretcher, Pets at Home,Poundworld, Icelands, Boots, Argos, Dominos,Ladbrokes, Harvester, Greggs, Costa, Subway, Vodafone, Carphone Warehouse, Shoe Zone,Timpsons, O2, Card Factory, Reflections and Giant

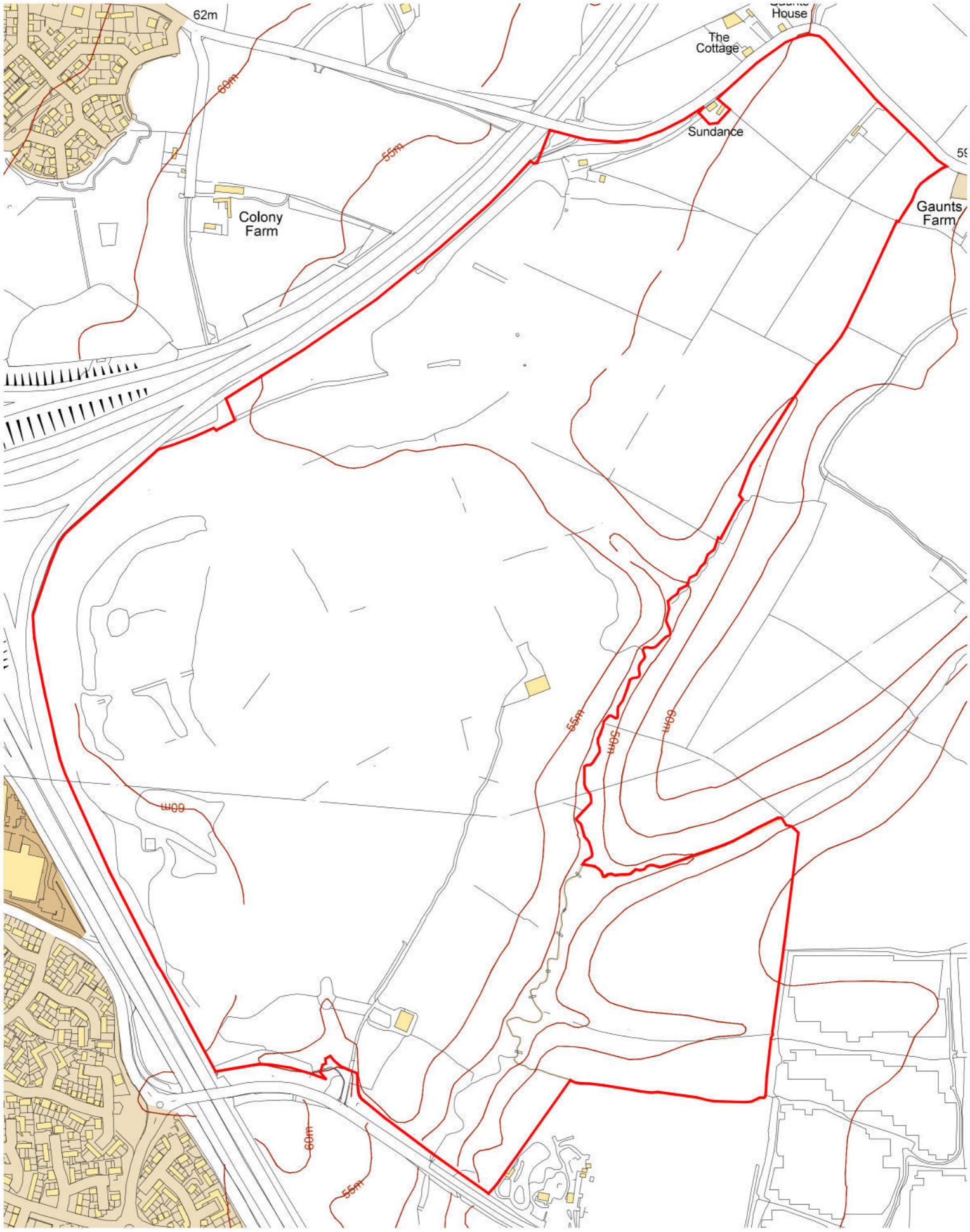
Woodlands Garden Village

Local Facilities and Amenities Plan

vectos

FIGURE:		
2.2		
DRAWN BY: SG	CHECKED BY: NB	DATE: 02/08/2017

APPENDIX A: INDICATIVE SCHEME LAYOUT



Development Boundary - 121.1ha (refer to conveyance plans)

1:5,000

0 250m

client: [redacted]

project: Woodlands Garden Village

drawing title: Site Location Plan

urbandesignbox.co.uk

Copyright of Urban Design Box. This drawing is for illustrative purposes only and should not be used for any construction or estimation purposes. No liability or responsibility is accepted arising from reliance upon the information contained within this drawing. DO NOT SCALE DRAWINGS.

job number:	drawing number:
SWS103	1001_1
scale	drawn
1:5000@A3	jvs
date:	status:
November 2016	preliminary

Urban Design Box
UDB

APPENDIX B: TRICS OUTOPUT

Calculation Reference: AUDIT-152303-170727-0724

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 09 - GOLF
Category : B - PRIVATE 18 HOLE COURSES

VEHICLES

Selected regions and areas:

06 WEST MIDLANDS
WO WORCESTERSHIRE 1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Secondary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Site area
Actual Range: 39.42 to 39.42 (units: hect)
Range Selected by User: 18.00 to 110.56 (units: hect)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/09 to 20/09/14

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:
Friday 1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:
Manual count 1 days
Directional ATC Count 0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:
Edge of Town 1

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:
Residential Zone 1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Secondary Filtering selection:

Use Class:
D2 1 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Secondary Filtering selection (Cont.):

Population within 1 mile:
15,001 to 20,000 1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:
125,001 to 250,000 1 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:
1.1 to 1.5 1 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:
No 1 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:
No PTAL Present 1 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 WO-09-B-01 GOLF CLUB WORCESTERSHIRE
BOUGHTON PARK

WORCESTER
Edge of Town
Residential Zone
Total Site area: 39.42 hect
Survey date: FRIDAY *23/05/14* *Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 09 - GOLF/B - PRIVATE 18 HOLE COURSES

VEHICLES

Calculation factor: 1 hect

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00	1	39.42	0.101	1	39.42	0.025	1	39.42	0.126
07:00 - 08:00	**1**	**39.42**	**0.837**	1	39.42	0.025	**1**	**39.42**	**0.862**
08:00 - 09:00	1	39.42	0.178	1	39.42	0.178	1	39.42	0.356
09:00 - 10:00	1	39.42	0.076	**1**	**39.42**	**0.609**	1	39.42	0.685
10:00 - 11:00	1	39.42	0.279	1	39.42	0.381	1	39.42	0.660
11:00 - 12:00	1	39.42	0.381	1	39.42	0.406	1	39.42	0.787
12:00 - 13:00	1	39.42	0.152	1	39.42	0.279	1	39.42	0.431
13:00 - 14:00	1	39.42	0.127	1	39.42	0.203	1	39.42	0.330
14:00 - 15:00	1	39.42	0.101	1	39.42	0.152	1	39.42	0.253
15:00 - 16:00	1	39.42	0.051	1	39.42	0.101	1	39.42	0.152
16:00 - 17:00	1	39.42	0.076	1	39.42	0.076	1	39.42	0.152
17:00 - 18:00	1	39.42	0.051	1	39.42	0.076	1	39.42	0.127
18:00 - 19:00	1	39.42	0.127	1	39.42	0.178	1	39.42	0.305
19:00 - 20:00	1	39.42	0.076	1	39.42	0.025	1	39.42	0.101
20:00 - 21:00	1	39.42	0.051	1	39.42	0.051	1	39.42	0.102
21:00 - 22:00	1	39.42	0.000	1	39.42	0.051	1	39.42	0.051
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			2.664			2.816			5.480

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	39.42 to 39.42 (units: hect)
Survey date date range:	01/01/09 - 20/09/14
Number of weekdays (Monday-Friday):	1
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 09 - GOLF/B - PRIVATE 18 HOLE COURSES

CARS

Calculation factor: 1 hect

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00	1	39.42	0.000	1	39.42	0.000	1	39.42	0.000
07:00 - 08:00	1	39.42	0.000	1	39.42	0.000	1	39.42	0.000
08:00 - 09:00	1	39.42	0.000	1	39.42	0.000	1	39.42	0.000
09:00 - 10:00	1	39.42	0.000	1	39.42	0.000	1	39.42	0.000
10:00 - 11:00	1	39.42	0.000	1	39.42	0.000	1	39.42	0.000
11:00 - 12:00	1	39.42	0.000	1	39.42	0.000	1	39.42	0.000
12:00 - 13:00	1	39.42	0.000	1	39.42	0.000	1	39.42	0.000
13:00 - 14:00	1	39.42	0.000	1	39.42	0.000	1	39.42	0.000
14:00 - 15:00	1	39.42	0.000	1	39.42	0.000	1	39.42	0.000
15:00 - 16:00	1	39.42	0.000	1	39.42	0.000	1	39.42	0.000
16:00 - 17:00	1	39.42	0.000	1	39.42	0.000	1	39.42	0.000
17:00 - 18:00	1	39.42	0.000	1	39.42	0.000	1	39.42	0.000
18:00 - 19:00	1	39.42	0.000	1	39.42	0.000	1	39.42	0.000
19:00 - 20:00	1	39.42	0.000	1	39.42	0.000	1	39.42	0.000
20:00 - 21:00	1	39.42	0.000	1	39.42	0.000	1	39.42	0.000
21:00 - 22:00	1	39.42	0.000	1	39.42	0.000	1	39.42	0.000
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.000			0.000			0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	39.42 to 39.42 (units: hect)
Survey date date range:	01/01/09 - 20/09/14
Number of weekdays (Monday-Friday):	1
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

APPENDIX C: WOODLADNS TRIP GENERATION METHODOLOGY

Woodlands Golf Club

Technical Note 1: Traffic Generation and Impact

Date: 15/06/2016

Introduction

This note outlines a high level trip generation associated with the alternative promoted site for the West of England Joint Spatial Strategy (JSP) which forms the extent of the Woodlands Golf Course at the northern fringe of Bristol. For the purpose of this note, the following development mix has been assumed:

- 2,000 dwellings;
- 2 Form Entry Primary School (420 pupils);
- Retail Provision / Local centre;
- Care Home (100 beds)

Trip Rates and Generation

The TRICS database has been used to derive appropriate trip rates for each of the above land uses in isolation. The TRICS output files are provided at **Appendix A**. The traffic generation forecast for dwellings is based on a 70/30 spilt of open market and affordable dwellings. It is also assumed that there will be 70/30 split of houses and flats.

The trip generation forecast will be refined once the mix and tenure of dwellings is established.

Table 1 provides a summary of the trip generation associated with the proposed development. it should however be noted that this does not make an allowance for any trip containment associated with the provision of complementary land uses within the site or demand management measures such as a Travel Plan. Details of the assumed trip containment is outlined later in this note.

Table 1: Trip Generation Summary

Land Use	AM Peak			PM Peak		
	IN	OUT	TOT	IN	OUT	TOT
Dwellings	241	616	856	573	358	931
Primary Education	116	82	198	11	18	29
Care Home	7	6	12	4	8	12
TOTAL	**363**	**704**	**1067**	**589**	**384**	**973**

Trip Containment

The proposed development schedule includes complementary land uses which would reduce the overall need to travel off site with trips contained within the site itself. In order to understand the potential for trip containment, data from the National Travel Survey (NTS0502) has been used to understand the purpose of trips. Table 2 provides a summary of the proposed vehicular trip generation associated with the site broken down into trip purpose.

Table 2: Trip Generation by journey purpose

Journey Purpose		Land Use	AM Peak			PM Peak		
			IN	OUT	TOT	IN	OUT	TOT
AM	PM	**Dwellings**	**241**	**616**	**856**	**573**	**358**	**931**
25%	*37%*	*To Emp*	*61*	*157*	*218*	*215*	*134*	*349*
4%	*12%*	*To Shop*	*9*	*24*	*34*	*70*	*44*	*114*
6%	*26%*	*Leisure*	*15*	*39*	*54*	*148*	*92*	*240*
50%	*4%*	*Edu*	*121*	*309*	*430*	*25*	*15*	*40*
14%	*20%*	*Other*	*34*	*87*	*121*	*116*	*72*	*188*
		Primary Education	**116**	**82**	**198**	**11**	**18**	**29**
		Care Home	**7**	**6**	**12**	**4**	**8**	**12**
		TOTAL	**363**	**704**	**1067**	**589**	**384**	**973**

For the purpose of this assessment the following assumptions have been made with regards to trip containment:

- 80%AofAtripsAtoAtheAproposedAprimaryAschoolAareAnternal;A
- 20%AofAretailAtripsAcontainedAwithinAtheAsite;A

The resultant trip containment is summarised in Table 2 below and the overall external vehicle tips summarised in Table 3. The methodology is set out in **Appendix B.**

Table 2: Internal Trips

Internal	Land Use	AM Peak			PM Peak		
		IN	OUT	TOT	IN	OUT	TOT
	Dwellings	**-97**	**-68**	**-165**	**-18**	**-28**	**-46**
	Employment	*0*	*0*	*0*	*0*	*0*	*0*
20%	*Retail*	*-2*	*-5*	*-7*	*-14*	*-9*	*-23*
20%	*Leisure*	*-3*	*-8*	*-11*	*-30*	*-18*	*-48*
	Edu	*-66*	*-92*	*-158*	*-14*	*-9*	*-23*
80%	**Primary Education**	**-92**	**-66**	**-158**	**-9**	**-14**	**-23**
	TOTAL	**-190**	**-134**	**-323**	**-27**	**-42**	**-69**

Table 3: Total External Trip Generation

	AM Peak			PM Peak		
	IN	OUT	TOT	IN	OUT	TOT
Trip Gen	363	704	1067	589	384	973
Internalisation	-190	-134	-323	-27	-42	-69
External Trips	173	570	743	562	341	904

As outlined in Table 3, the proposed scheme could generate around 733 external car trips during the AM peak hour and 856 external car tips during the PM peak hour. This is however prior to the implementation of any demand management measures.

Sustainable Travel and Travel Planning

Personalised Travel Planning

Research conducted by SUSTRANS suggest that personalised Travel Plan can reduce the proportion of single occupancy car trips by between 10% and 15%. It is therefore proposed that a reduction of 12% is applied to the external traffic generation associated with the development as a result of Personalised Travel Planning.

Cycling Strategy

We have partnered with SUSTRANS to develop a coherent cycling strategy for the proposed scheme. These measures are likely to provide further discounts to car travel associated with the site.

Public Transport Strategy

Public transport will be facilitated through linking the Metrobus to the site as a feeder service.

The Metrobus route provides a more reliable and quicker service when compared to standard bus services within Bristol. It also provides a journey time saving of 7 minutes between Aztec West and Bristol City Centre. Buses that operate along the metrobus will benefit from wifi and charging points for electronic devices.

It is envisaged that the linking of the metrobus route to the Woodlands scheme would provide further discount to car trips associated with the site.

It is envisaged that the implementation of Personalised Travel Planning alone could deliver a reduction in car trips in the region of 10% to 15%. Taking into account the measures outlined above then we have assumed that the implementation of a travel plan and associated sustainable transport infrastructure could deliver a reduction in car travel by 20% as an absolute minimum. Significant improvements to sustainable access provision such as the metro bus and strategic cycle links form the site could deliver higher levels of car use reductions.

In light of the above, a conservative discount of 12% to car trips has been applied to the external vehicular trip forecast to account for PTP. However, it is likely that further discounts would be achieved through a sustainable access strategy.

Table 4 provides a summary of the external traffic generation, the benefits of the Travel Plan and sustainable infrastructure measures and the overall residual external traffic generation associated with the development.

Table 4 Residual Traffic Generation Forecast

	AM Peak			PM Peak		
	IN	OUT	TOT	IN	OUT	TOT
External Trips	173A	570A	743A	562A	341A	904A
Sustainable measures discount (12%)	-21A	-68A	-89A	-67A	-41A	-108A
Residual Traffic Generation	153	502	654	495	300	795

Following the implementation of the Travel Plan and sustainable access strategy that the residual external vehicle trip generation associated with the site would be 654 vehicles during the AM peak hour and 795 during the PM peak hour. It should be noted that the above numbers do not take into account the traffic generation associated with the existing use of the site and therefore the net increase in traffic associated with the re-development of the Woodlands site would be less.

Appendix A – TRICS

Calculation Reference: AUDIT-152303-161031-1022

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
Category : B - AFFORDABLE/LOCAL AUTHORITY HOUSES

VEHICLES

Selected regions and areas:

06	**WEST MIDLANDS**		
	WM	WEST MIDLANDS	1 days
07	**YORKSHIRE & NORTH LINCOLNSHIRE**		
	WY	WEST YORKSHIRE	2 days
08	**NORTH WEST**		
	CH	CHESHIRE	1 days
	GM	GREATER MANCHESTER	1 days
	MS	MERSEYSIDE	1 days
09	**NORTH**		
	NB	NORTHUMBERLAND	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Filtering Stage 2 selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter:	Number of dwellings
Actual Range:	16 to 97 (units:)
Range Selected by User:	14 to 473 (units:)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/08 to 21/10/15

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	3 days
Tuesday	2 days
Wednesday	1 days
Thursday	1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	7 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Suburban Area (PPS6 Out of Centre)	2
Edge of Town	5

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Residential Zone	5
Built-Up Zone	1
No Sub Category	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Filtering Stage 3 selection:

Use Class:

C3	7 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

1,001 to 5,000	1 days
5,001 to 10,000	1 days
10,001 to 15,000	1 days
15,001 to 20,000	2 days
25,001 to 50,000	2 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

5,001 to 25,000	1 days
75,001 to 100,000	2 days
125,001 to 250,000	2 days
250,001 to 500,000	2 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	6 days
1.1 to 1.5	1 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

No	7 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

LIST OF SITES relevant to selection parameters

1 **CH-03-B-01** **HOUSES & FLATS** **CHESHIRE**
WORDSWORTH CRES.
BLACON
CHESTER
Edge of Town
Residential Zone
Total Number of dwellings: 80
Survey date: MONDAY *17/11/14* *Survey Type: MANUAL*

2 **GM-03-B-01** **TERRACED HOUSES** **GREATER MANCHESTER**
NEWBOLD

ROCHDALE
Suburban Area (PPS6 Out of Centre)
No Sub Category
Total Number of dwellings: 43
Survey date: WEDNESDAY *21/10/15* *Survey Type: MANUAL*

3 **MS-03-B-01** **TERRACED** **MERSEYSIDE**
TARBOCK ROAD
SPEKE
LIVERPOOL
Edge of Town
Residential Zone
Total Number of dwellings: 16
Survey date: TUESDAY *18/06/13* *Survey Type: MANUAL*

4 **NB-03-B-01** **SEMI DET. & TERRACED** **NORTHUMBERLAND**
WESTLEA

BEDLINGTON
Edge of Town
Residential Zone
Total Number of dwellings: 97
Survey date: MONDAY *19/11/12* *Survey Type: MANUAL*

5 **WM-03-B-01** **SEMI DET./TERRACED** **WEST MIDLANDS**
YORKMINSTER DRIVE
CHELMSLEY WOOD
BIRMINGHAM
Edge of Town
Residential Zone
Total Number of dwellings: 97
Survey date: MONDAY *17/10/11* *Survey Type: MANUAL*

6 **WY-03-B-02** **MIXED HOUSES** **WEST YORKSHIRE**
WHITEACRE STREET
DEIGHTON
HUDDERSFIELD
Edge of Town
Residential Zone
Total Number of dwellings: 54
Survey date: TUESDAY *17/09/13* *Survey Type: MANUAL*

7 **WY-03-B-03** **TERRACED HOUSES** **WEST YORKSHIRE**
LINCOLN GREEN ROAD

LEEDS
Suburban Area (PPS6 Out of Centre)
Built-Up Zone
Total Number of dwellings: 29
Survey date: THURSDAY *19/09/13* *Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 03 - RESIDENTIAL/B - AFFORDABLE/LOCAL AUTHORITY HOUSES

VEHICLES

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	7	59	0.070	7	59	0.171	7	59	0.241
08:00 - 09:00	7	59	0.156	**7**	**59**	**0.284**	7	59	0.440
09:00 - 10:00	7	59	0.154	7	59	0.216	7	59	0.370
10:00 - 11:00	7	59	0.175	7	59	0.180	7	59	0.355
11:00 - 12:00	7	59	0.166	7	59	0.168	7	59	0.334
12:00 - 13:00	7	59	0.192	7	59	0.154	7	59	0.346
13:00 - 14:00	7	59	0.171	7	59	0.154	7	59	0.325
14:00 - 15:00	7	59	0.212	7	59	0.202	7	59	0.414
15:00 - 16:00	7	59	0.248	7	59	0.212	7	59	0.460
16:00 - 17:00	7	59	0.267	7	59	0.168	7	59	0.435
17:00 - 18:00	**7**	**59**	**0.293**	7	59	0.209	**7**	**59**	**0.502**
18:00 - 19:00	7	59	0.185	7	59	0.142	7	59	0.327
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			2.289			2.260			4.549

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	16 - 97 (units:)
Survey date date range:	01/01/08 - 21/10/15
Number of weekdays (Monday-Friday):	7
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/B - AFFORDABLE/LOCAL AUTHORITY HOUSES

TAXIS

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	7	59	0.007	7	59	0.007	7	59	0.014
08:00 - 09:00	7	59	0.007	7	59	0.007	7	59	0.014
09:00 - 10:00	7	59	0.017	7	59	0.014	7	59	0.031
10:00 - 11:00	**7**	**59**	**0.019**	**7**	**59**	**0.024**	**7**	**59**	**0.043**
11:00 - 12:00	7	59	0.014	7	59	0.014	7	59	0.028
12:00 - 13:00	7	59	0.014	7	59	0.012	7	59	0.026
13:00 - 14:00	7	59	0.010	7	59	0.012	7	59	0.022
14:00 - 15:00	7	59	0.012	7	59	0.010	7	59	0.022
15:00 - 16:00	7	59	0.017	7	59	0.017	7	59	0.034
16:00 - 17:00	7	59	0.010	7	59	0.007	7	59	0.017
17:00 - 18:00	7	59	0.007	7	59	0.007	7	59	0.014
18:00 - 19:00	7	59	0.007	7	59	0.007	7	59	0.014
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.141			0.138			0.279

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	16 - 97 (units:)
Survey date date range:	01/01/08 - 21/10/15
Number of weekdays (Monday-Friday):	7
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/B - AFFORDABLE/LOCAL AUTHORITY HOUSES

OGVS

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	7	59	0.000	7	59	0.000	7	59	0.000
08:00 - 09:00	**7**	**59**	**0.005**	7	59	0.002	7	59	0.007
09:00 - 10:00	7	59	0.002	**7**	**59**	**0.005**	7	59	0.007
10:00 - 11:00	7	59	0.005	7	59	0.005	**7**	**59**	**0.010**
11:00 - 12:00	7	59	0.000	7	59	0.000	7	59	0.000
12:00 - 13:00	7	59	0.000	7	59	0.000	7	59	0.000
13:00 - 14:00	7	59	0.002	7	59	0.002	7	59	0.004
14:00 - 15:00	7	59	0.002	7	59	0.002	7	59	0.004
15:00 - 16:00	7	59	0.000	7	59	0.000	7	59	0.000
16:00 - 17:00	7	59	0.000	7	59	0.000	7	59	0.000
17:00 - 18:00	7	59	0.000	7	59	0.000	7	59	0.000
18:00 - 19:00	7	59	0.002	7	59	0.002	7	59	0.004
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.018			0.018			0.036

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	16 - 97 (units:)
Survey date date range:	01/01/08 - 21/10/15
Number of weekdays (Monday-Friday):	7
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/B - AFFORDABLE/LOCAL AUTHORITY HOUSES

PSVS

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	7	59	0.000	7	59	0.000	7	59	0.000
08:00 - 09:00	7	59	0.000	7	59	0.000	7	59	0.000
09:00 - 10:00	7	59	0.000	7	59	0.000	7	59	0.000
10:00 - 11:00	**7**	**59**	**0.002**	**7**	**59**	**0.002**	**7**	**59**	**0.004**
11:00 - 12:00	7	59	0.000	7	59	0.000	7	59	0.000
12:00 - 13:00	7	59	0.000	7	59	0.000	7	59	0.000
13:00 - 14:00	7	59	0.000	7	59	0.000	7	59	0.000
14:00 - 15:00	7	59	0.000	7	59	0.000	7	59	0.000
15:00 - 16:00	7	59	0.000	7	59	0.000	7	59	0.000
16:00 - 17:00	7	59	0.000	7	59	0.000	7	59	0.000
17:00 - 18:00	7	59	0.000	7	59	0.000	7	59	0.000
18:00 - 19:00	7	59	0.000	7	59	0.000	7	59	0.000
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.002			0.002			0.004

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	16 - 97 (units:)
Survey date date range:	01/01/08 - 21/10/15
Number of weekdays (Monday-Friday):	7
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/B - AFFORDABLE/LOCAL AUTHORITY HOUSES

CYCLISTS

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	7	59	0.002	7	59	0.000	7	59	0.002
08:00 - 09:00	7	59	0.002	7	59	0.012	7	59	0.014
09:00 - 10:00	7	59	0.005	7	59	0.005	7	59	0.010
10:00 - 11:00	7	59	0.002	7	59	0.000	7	59	0.002
11:00 - 12:00	7	59	0.002	7	59	0.000	7	59	0.002
12:00 - 13:00	7	59	0.000	7	59	0.000	7	59	0.000
13:00 - 14:00	7	59	0.000	7	59	0.000	7	59	0.000
14:00 - 15:00	7	59	0.000	7	59	0.000	7	59	0.000
15:00 - 16:00	7	59	0.007	7	59	0.005	7	59	0.012
16:00 - 17:00	**7**	**59**	**0.014**	**7**	**59**	**0.014**	**7**	**59**	**0.028**
17:00 - 18:00	7	59	0.005	7	59	0.000	7	59	0.005
18:00 - 19:00	7	59	0.000	7	59	0.000	7	59	0.000
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.039			0.036			0.075

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	16 - 97 (units:)
Survey date date range:	01/01/08 - 21/10/15
Number of weekdays (Monday-Friday):	7
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Calculation Reference: AUDIT-152303-161031-1046

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
Category : D - AFFORDABLE/LOCAL AUTHORITY FLATS

VEHICLES

Selected regions and areas:

02	**SOUTH EAST**		
	ES	EAST SUSSEX	1 days
	HC	HAMPSHIRE	2 days
	OX	OXFORDSHIRE	1 days
03	**SOUTH WEST**		
	BR	BRISTOL CITY	1 days
05	**EAST MIDLANDS**		
	LN	LINCOLNSHIRE	1 days
	NT	NOTTINGHAMSHIRE	1 days
06	**WEST MIDLANDS**		
	HE	HEREFORDSHIRE	1 days
	WM	WEST MIDLANDS	1 days
	WO	WORCESTERSHIRE	1 days
07	**YORKSHIRE & NORTH LINCOLNSHIRE**		
	WY	WEST YORKSHIRE	1 days
08	**NORTH WEST**		
	CH	CHESHIRE	1 days
	MS	MERSEYSIDE	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Filtering Stage 2 selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Number of dwellings
Actual Range: 6 to 120 (units:)
Range Selected by User: 6 to 234 (units:)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/08 to 24/11/15

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	2 days
Tuesday	5 days
Wednesday	1 days
Thursday	4 days
Friday	1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	13 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Suburban Area (PPS6 Out of Centre)	7
Edge of Town	4
Neighbourhood Centre (PPS6 Local Centre)	2

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Filtering Stage 3 selection:

Use Class:

C3	13 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

1,001 to 5,000	2 days
5,001 to 10,000	2 days
15,001 to 20,000	1 days
20,001 to 25,000	2 days
25,001 to 50,000	5 days
50,001 to 100,000	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

5,001 to 25,000	1 days
75,001 to 100,000	1 days
100,001 to 125,000	1 days
125,001 to 250,000	4 days
250,001 to 500,000	5 days
500,001 or More	1 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.5 or Less	1 days
0.6 to 1.0	6 days
1.1 to 1.5	6 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

No	13 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

LIST OF SITES relevant to selection parameters

1 BR-03-D-03 BLOCKS OF FLATS BRISTOL CITY
BRISTOL ROAD

BRISTOL
Edge of Town
No Sub Category
Total Number of dwellings: 28
Survey date: TUESDAY *13/10/09* *Survey Type: MANUAL*

2 CH-03-D-01 BLOCK OF FLATS CHESHIRE
HEATH LANE
BOUGHTON HEATH
CHESTER
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 30
Survey date: THURSDAY *24/05/12* *Survey Type: MANUAL*

3 ES-03-D-06 FLATS & HOUSES EAST SUSSEX
WELLINGTON ROAD

BRIGHTON
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 15
Survey date: THURSDAY *16/10/14* *Survey Type: MANUAL*

4 HC-03-D-05 BLOCK OF FLATS HAMPSHIRE
WORTING ROAD

BASINGSTOKE
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 29
Survey date: MONDAY *18/10/10* *Survey Type: MANUAL*

5 HC-03-D-06 BLOCKS OF FLATS HAMPSHIRE
HANNAY RISE
THORNHILL
SOUTHAMPTON
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 66
Survey date: TUESDAY *24/11/15* *Survey Type: MANUAL*

6 HE-03-D-01 BLOCK OF FLATS HEREFORDSHIRE
BROXASH DRIVE

HEREFORD
Neighbourhood Centre (PPS6 Local Centre)
Residential Zone
Total Number of dwellings: 120
Survey date: FRIDAY *22/10/10* *Survey Type: MANUAL*

7 LN-03-D-02 FLATS LINCOLNSHIRE
ADDISON DRIVE

LINCOLN
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 22
Survey date: WEDNESDAY *01/07/15* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

8	**MS-03-D-01**	**BLOCK OF FLATS**		**MERSEYSIDE**
	UPPER PARLIAMENT ST			
	TOXTETH			
	LIVERPOOL			
	Suburban Area (PPS6 Out of Centre)			
	Residential Zone			
	Total Number of dwellings:		38	
	Survey date: TUESDAY		*07/09/10*	*Survey Type: MANUAL*
9	**NT-03-D-02**	**BLOCK OF FLATS**		**NOTTINGHAMSHIRE**
	WATCOMBE ROAD			
	CARRINGTON			
	NOTTINGHAM			
	Suburban Area (PPS6 Out of Centre)			
	Residential Zone			
	Total Number of dwellings:		22	
	Survey date: TUESDAY		*23/06/15*	*Survey Type: MANUAL*
10	**OX-03-D-01**	**FLATS**		**OXFORDSHIRE**
	FAIRLAWN END			
	UPPER WOLVERCOTE			
	OXFORD			
	Edge of Town			
	Residential Zone			
	Total Number of dwellings:		6	
	Survey date: TUESDAY		*05/10/10*	*Survey Type: MANUAL*
11	**WM-03-D-02**	**BLOCKS OF FLATS**		**WEST MIDLANDS**
	BRANCH ROAD			
	KINGS NORTON			
	BIRMINGHAM			
	Edge of Town			
	Residential Zone			
	Total Number of dwellings:		84	
	Survey date: MONDAY		*09/11/15*	*Survey Type: MANUAL*
12	**WO-03-D-02**	**BLOCKS OF FLATS**		**WORCESTERSHIRE**
	CRANHAM DRIVE			
	WORCESTER			
	Neighbourhood Centre (PPS6 Local Centre)			
	Residential Zone			
	Total Number of dwellings:		18	
	Survey date: THURSDAY		*22/05/14*	*Survey Type: MANUAL*
13	**WY-03-D-03**	**BLOCK OF FLATS**		**WEST YORKSHIRE**
	CARR STREET			
	LIVERSEDGE			
	HECKMONDWIKE			
	Edge of Town			
	Residential Zone			
	Total Number of dwellings:		56	
	Survey date: THURSDAY		*01/05/14*	*Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 03 - RESIDENTIAL/D - AFFORDABLE/LOCAL AUTHORITY FLATS

VEHICLES

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	13	41	0.034	13	41	0.075	13	41	0.109
08:00 - 09:00	13	41	0.079	13	41	0.110	13	41	0.189
09:00 - 10:00	13	41	0.082	13	41	0.090	13	41	0.172
10:00 - 11:00	13	41	0.112	13	41	0.105	13	41	0.217
11:00 - 12:00	13	41	0.086	13	41	0.096	13	41	0.182
12:00 - 13:00	13	41	0.090	13	41	0.081	13	41	0.171
13:00 - 14:00	13	41	0.116	13	41	0.105	13	41	0.221
14:00 - 15:00	13	41	0.116	13	41	0.137	13	41	0.253
15:00 - 16:00	13	41	0.112	13	41	0.105	13	41	0.217
16:00 - 17:00	13	41	0.144	13	41	0.094	13	41	0.238
17:00 - 18:00	13	41	0.122	13	41	0.112	13	41	0.234
18:00 - 19:00	13	41	0.137	13	41	0.096	13	41	0.233
19:00 - 20:00	2	18	0.114	2	18	0.086	2	18	0.200
20:00 - 21:00	**2**	**18**	**0.200**	**2**	**18**	**0.200**	**2**	**18**	**0.400**
21:00 - 22:00	2	18	0.086	2	18	0.086	2	18	0.172
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			1.630			1.578			3.208

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	6 - 120 (units:)
Survey date date range:	01/01/08 - 24/11/15
Number of weekdays (Monday-Friday):	13
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/D - AFFORDABLE/LOCAL AUTHORITY FLATS

TAXIS

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	13	41	0.002	13	41	0.002	13	41	0.004
08:00 - 09:00	**13**	**41**	**0.009**	**13**	**41**	**0.009**	**13**	**41**	**0.018**
09:00 - 10:00	13	41	0.000	13	41	0.000	13	41	0.000
10:00 - 11:00	13	41	0.004	13	41	0.004	13	41	0.008
11:00 - 12:00	13	41	0.000	13	41	0.000	13	41	0.000
12:00 - 13:00	13	41	0.006	13	41	0.004	13	41	0.010
13:00 - 14:00	13	41	0.007	13	41	0.006	13	41	0.013
14:00 - 15:00	13	41	0.006	13	41	0.007	13	41	0.013
15:00 - 16:00	13	41	0.004	13	41	0.006	13	41	0.010
16:00 - 17:00	13	41	0.004	13	41	0.004	13	41	0.008
17:00 - 18:00	13	41	0.006	13	41	0.002	13	41	0.008
18:00 - 19:00	13	41	0.006	13	41	0.009	13	41	0.015
19:00 - 20:00	2	18	0.000	2	18	0.000	2	18	0.000
20:00 - 21:00	2	18	0.000	2	18	0.000	2	18	0.000
21:00 - 22:00	2	18	0.000	2	18	0.000	2	18	0.000
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.054			0.053			0.107

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	6 - 120 (units:)
Survey date date range:	01/01/08 - 24/11/15
Number of weekdays (Monday-Friday):	13
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/D - AFFORDABLE/LOCAL AUTHORITY FLATS

OGVS

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	13	41	0.000	13	41	0.000	13	41	0.000
08:00 - 09:00	13	41	0.004	13	41	0.000	13	41	0.004
09:00 - 10:00	13	41	0.000	13	41	0.004	13	41	0.004
10:00 - 11:00	**13**	**41**	**0.006**	**13**	**41**	**0.006**	**13**	**41**	**0.012**
11:00 - 12:00	13	41	0.002	13	41	0.002	13	41	0.004
12:00 - 13:00	13	41	0.000	13	41	0.000	13	41	0.000
13:00 - 14:00	13	41	0.002	13	41	0.002	13	41	0.004
14:00 - 15:00	13	41	0.000	13	41	0.000	13	41	0.000
15:00 - 16:00	13	41	0.002	13	41	0.002	13	41	0.004
16:00 - 17:00	13	41	0.000	13	41	0.000	13	41	0.000
17:00 - 18:00	13	41	0.002	13	41	0.002	13	41	0.004
18:00 - 19:00	13	41	0.000	13	41	0.000	13	41	0.000
19:00 - 20:00	2	18	0.000	2	18	0.000	2	18	0.000
20:00 - 21:00	2	18	0.000	2	18	0.000	2	18	0.000
21:00 - 22:00	2	18	0.000	2	18	0.000	2	18	0.000
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.018			0.018			0.036

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	6 - 120 (units:)
Survey date date range:	01/01/08 - 24/11/15
Number of weekdays (Monday-Friday):	13
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/D - AFFORDABLE/LOCAL AUTHORITY FLATS

PSVS

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	13	41	0.000	13	41	0.000	13	41	0.000
08:00 - 09:00	13	41	0.000	13	41	0.000	13	41	0.000
09:00 - 10:00	13	41	0.000	13	41	0.000	13	41	0.000
10:00 - 11:00	13	41	0.000	13	41	0.000	13	41	0.000
11:00 - 12:00	13	41	0.000	13	41	0.000	13	41	0.000
12:00 - 13:00	13	41	0.002	13	41	0.002	13	41	0.004
13:00 - 14:00	13	41	0.002	13	41	0.002	13	41	0.004
14:00 - 15:00	13	41	0.002	13	41	0.002	13	41	0.004
15:00 - 16:00	13	41	0.000	13	41	0.000	13	41	0.000
16:00 - 17:00	**13**	**41**	**0.006**	**13**	**41**	**0.006**	**13**	**41**	**0.012**
17:00 - 18:00	13	41	0.002	13	41	0.002	13	41	0.004
18:00 - 19:00	13	41	0.000	13	41	0.000	13	41	0.000
19:00 - 20:00	2	18	0.000	2	18	0.000	2	18	0.000
20:00 - 21:00	2	18	0.000	2	18	0.000	2	18	0.000
21:00 - 22:00	2	18	0.000	2	18	0.000	2	18	0.000
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.014			0.014			0.028

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	6 - 120 (units:)
Survey date date range:	01/01/08 - 24/11/15
Number of weekdays (Monday-Friday):	13
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/D - AFFORDABLE/LOCAL AUTHORITY FLATS

CYCLISTS

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	13	41	0.000	13	41	0.004	13	41	0.004
08:00 - 09:00	13	41	0.002	**13**	**41**	**0.013**	**13**	**41**	**0.015**
09:00 - 10:00	13	41	0.000	13	41	0.002	13	41	0.002
10:00 - 11:00	13	41	0.004	13	41	0.000	13	41	0.004
11:00 - 12:00	13	41	0.006	13	41	0.002	13	41	0.008
12:00 - 13:00	13	41	0.002	13	41	0.000	13	41	0.002
13:00 - 14:00	13	41	0.000	13	41	0.002	13	41	0.002
14:00 - 15:00	13	41	0.000	13	41	0.000	13	41	0.000
15:00 - 16:00	**13**	**41**	**0.007**	13	41	0.000	13	41	0.007
16:00 - 17:00	13	41	0.004	13	41	0.006	13	41	0.010
17:00 - 18:00	13	41	0.007	13	41	0.000	13	41	0.007
18:00 - 19:00	13	41	0.002	13	41	0.004	13	41	0.006
19:00 - 20:00	2	18	0.000	2	18	0.000	2	18	0.000
20:00 - 21:00	2	18	0.000	2	18	0.000	2	18	0.000
21:00 - 22:00	2	18	0.000	2	18	0.000	2	18	0.000
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.034			0.033			0.067

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	6 - 120 (units:)
Survey date date range:	01/01/08 - 24/11/15
Number of weekdays (Monday-Friday):	13
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Calculation Reference: AUDIT-152303-161024-1052

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 05 - HEALTH
Category : F - CARE HOME (ELDERLY RESIDENTIAL)

VEHICLES

Selected regions and areas:

02	**SOUTH EAST**		
	HC	HAMPSHIRE	1 days
	HF	HERTFORDSHIRE	1 days
	WG	WOKINGHAM	1 days
03	**SOUTH WEST**		
	DC	DORSET	1 days
04	**EAST ANGLIA**		
	SF	SUFFOLK	1 days
05	**EAST MIDLANDS**		
	DS	DERBYSHIRE	1 days
06	**WEST MIDLANDS**		
	WK	WARWICKSHIRE	1 days
07	**YORKSHIRE & NORTH LINCOLNSHIRE**		
	NY	NORTH YORKSHIRE	1 days
	WY	WEST YORKSHIRE	1 days
08	**NORTH WEST**		
	CH	CHESHIRE	1 days
	GM	GREATER MANCHESTER	1 days
10	**WALES**		
	CP	CAERPHILLY	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Filtering Stage 2 selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Number of residents
Actual Range: 17 to 120 (units:)
Range Selected by User: 17 to 180 (units:)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/08 to 24/11/15

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	1 days
Tuesday	4 days
Wednesday	3 days
Thursday	1 days
Friday	3 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	12 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Suburban Area (PPS6 Out of Centre)	7
Edge of Town	3
Neighbourhood Centre (PPS6 Local Centre)	2

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Development Zone	1
Residential Zone	8
Village	2
No Sub Category	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Filtering Stage 3 selection:

Use Class:

C2	12 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

1,000 or Less	2 days
5,001 to 10,000	2 days
10,001 to 15,000	2 days
20,001 to 25,000	2 days
25,001 to 50,000	4 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

5,001 to 25,000	1 days
75,001 to 100,000	1 days
100,001 to 125,000	1 days
125,001 to 250,000	3 days
250,001 to 500,000	5 days
500,001 or More	1 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	3 days
1.1 to 1.5	8 days
1.6 to 2.0	1 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

No	12 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

LIST OF SITES relevant to selection parameters

1 **CH-05-F-01** **NURSING HOME** **CHESHIRE**
CREWE ROAD
HASLINGTON
NEAR CREWE
Neighbourhood Centre (PPS6 Local Centre)
Village
Total Number of residents: 88
Survey date: FRIDAY *17/10/08* *Survey Type: MANUAL*

2 **CP-05-F-01** **NURS./RES. HOMES** **CAERPHILLY**
OLD NANTGARW ROAD
NANTGARW
NEAR CARDIFF
Neighbourhood Centre (PPS6 Local Centre)
Village
Total Number of residents: 93
Survey date: FRIDAY *19/09/08* *Survey Type: MANUAL*

3 **DC-05-F-02** **NURSING HOME** **DORSET**
WHARNCLIFFE ROAD
BOSCOMBE
BOURNEMOUTH
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of residents: 43
Survey date: WEDNESDAY *16/07/08* *Survey Type: MANUAL*

4 **DS-05-F-01** **NURSING HOME** **DERBYSHIRE**
29 VILLAGE STREET

DERBY
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of residents: 70
Survey date: TUESDAY *21/10/14* *Survey Type: MANUAL*

5 **GM-05-F-03** **NURSING HOME** **GREATER MANCHESTER**
HALIFAX ROAD

ROCHDALE
Edge of Town
Residential Zone
Total Number of residents: 30
Survey date: WEDNESDAY *29/05/13* *Survey Type: MANUAL*

6 **HC-05-F-01** **CARE HOME** **HAMPSHIRE**
BOTLEY ROAD

SOUTHAMPTON
Edge of Town
No Sub Category
Total Number of residents: 42
Survey date: TUESDAY *24/11/15* *Survey Type: MANUAL*

7 **HF-05-F-01** **NURSING HOME** **HERTFORDSHIRE**
EXPLORER DRIVE

WATFORD
Suburban Area (PPS6 Out of Centre)
Development Zone
Total Number of residents: 120
Survey date: WEDNESDAY *16/07/08* *Survey Type: MANUAL*

8 **NY-05-F-01** **NURSING HOME** **NORTH YORKSHIRE**
HARROGATE ROAD

RIPON
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of residents: 38
Survey date: MONDAY *22/09/08* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

9	**SF-05-F-01**	**CARE HOME**		**SUFFOLK**
	COLCHESTER ROAD			
	IPSWICH			
	Edge of Town			
	Residential Zone			
	Total Number of residents:		17	
	Survey date: FRIDAY		*18/09/15*	*Survey Type: MANUAL*
10	**WG-05-F-01**	**NURSING HOME**		**WOKINGHAM**
	BARKHAM ROAD			
	WOKINGHAM			
	Suburban Area (PPS6 Out of Centre)			
	Residential Zone			
	Total Number of residents:		58	
	Survey date: TUESDAY		*20/11/12*	*Survey Type: MANUAL*
11	**WK-05-F-01**	**NURSING HOME**		**WARWICKSHIRE**
	CLARENDON SQUARE			
	LEAMINGTON SPA			
	Suburban Area (PPS6 Out of Centre)			
	Residential Zone			
	Total Number of residents:		32	
	Survey date: THURSDAY		*25/10/12*	*Survey Type: MANUAL*
12	**WY-05-F-01**	**NURSING HOME**		**WEST YORKSHIRE**
	CLIFF ROAD			
	HYDE PARK			
	LEEDS			
	Suburban Area (PPS6 Out of Centre)			
	Residential Zone			
	Total Number of residents:		58	
	Survey date: TUESDAY		*15/06/10*	*Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 05 - HEALTH/F - CARE HOME (ELDERLY RESIDENTIAL)

VEHICLES

Calculation factor: 1 RESIDE

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. RESIDE	Trip Rate	No. Days	Ave. RESIDE	Trip Rate	No. Days	Ave. RESIDE	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	**12**	**57**	**0.115**	12	57	0.054	12	57	0.169
08:00 - 09:00	12	57	0.067	12	57	0.057	12	57	0.124
09:00 - 10:00	12	57	0.057	12	57	0.023	12	57	0.080
10:00 - 11:00	12	57	0.077	12	57	0.054	12	57	0.131
11:00 - 12:00	12	57	0.068	12	57	0.075	12	57	0.143
12:00 - 13:00	12	57	0.057	12	57	0.068	12	57	0.125
13:00 - 14:00	12	57	0.089	12	57	0.071	12	57	0.160
14:00 - 15:00	12	57	0.103	12	57	0.109	**12**	**57**	**0.212**
15:00 - 16:00	12	57	0.074	**12**	**57**	**0.113**	12	57	0.187
16:00 - 17:00	12	57	0.049	12	57	0.081	12	57	0.130
17:00 - 18:00	12	57	0.044	12	57	0.080	12	57	0.124
18:00 - 19:00	12	57	0.052	12	57	0.065	12	57	0.117
19:00 - 20:00	10	51	0.069	10	51	0.049	10	51	0.118
20:00 - 21:00	9	52	0.037	9	52	0.052	9	52	0.089
21:00 - 22:00	1	38	0.026	1	38	0.026	1	38	0.052
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.984			0.977			1.961

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	17 - 120 (units:)
Survey date date range:	01/01/08 - 24/11/15
Number of weekdays (Monday-Friday):	12
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 05 - HEALTH/F - CARE HOME (ELDERLY RESIDENTIAL)

TAXIS

Calculation factor: 1 RESIDE

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. RESIDE	Trip Rate	No. Days	Ave. RESIDE	Trip Rate	No. Days	Ave. RESIDE	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	12	57	0.004	12	57	0.003	12	57	0.007
08:00 - 09:00	12	57	0.001	12	57	0.003	12	57	0.004
09:00 - 10:00	12	57	0.001	12	57	0.001	12	57	0.002
10:00 - 11:00	12	57	0.003	12	57	0.000	12	57	0.003
11:00 - 12:00	12	57	0.001	12	57	0.004	12	57	0.005
12:00 - 13:00	12	57	0.004	12	57	0.003	12	57	0.007
13:00 - 14:00	12	57	0.003	12	57	0.004	12	57	0.007
14:00 - 15:00	**12**	**57**	**0.007**	**12**	**57**	**0.007**	**12**	**57**	**0.014**
15:00 - 16:00	12	57	0.004	12	57	0.003	12	57	0.007
16:00 - 17:00	12	57	0.003	12	57	0.004	12	57	0.007
17:00 - 18:00	12	57	0.001	12	57	0.001	12	57	0.002
18:00 - 19:00	12	57	0.003	12	57	0.003	12	57	0.006
19:00 - 20:00	10	51	0.002	10	51	0.002	10	51	0.004
20:00 - 21:00	9	52	0.000	9	52	0.000	9	52	0.000
21:00 - 22:00	1	38	0.000	1	38	0.000	1	38	0.000
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.037			0.038			0.075

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	17 - 120 (units:)
Survey date date range:	01/01/08 - 24/11/15
Number of weekdays (Monday-Friday):	12
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 05 - HEALTH/F - CARE HOME (ELDERLY RESIDENTIAL)

OGVS

Calculation factor: 1 RESIDE

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. RESIDE	Trip Rate	No. Days	Ave. RESIDE	Trip Rate	No. Days	Ave. RESIDE	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	12	57	0.004	12	57	0.003	12	57	0.007
08:00 - 09:00	12	57	0.000	12	57	0.001	12	57	0.001
09:00 - 10:00	12	57	0.000	12	57	0.000	12	57	0.000
10:00 - 11:00	**12**	**57**	**0.006**	12	57	0.003	12	57	0.009
11:00 - 12:00	12	57	0.004	**12**	**57**	**0.006**	**12**	**57**	**0.010**
12:00 - 13:00	12	57	0.001	12	57	0.003	12	57	0.004
13:00 - 14:00	12	57	0.000	12	57	0.000	12	57	0.000
14:00 - 15:00	12	57	0.000	12	57	0.000	12	57	0.000
15:00 - 16:00	12	57	0.000	12	57	0.000	12	57	0.000
16:00 - 17:00	12	57	0.000	12	57	0.000	12	57	0.000
17:00 - 18:00	12	57	0.000	12	57	0.000	12	57	0.000
18:00 - 19:00	12	57	0.000	12	57	0.000	12	57	0.000
19:00 - 20:00	10	51	0.000	10	51	0.000	10	51	0.000
20:00 - 21:00	9	52	0.000	9	52	0.000	9	52	0.000
21:00 - 22:00	1	38	0.000	1	38	0.000	1	38	0.000
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.015			0.016			0.031

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	17 - 120 (units:)
Survey date date range:	01/01/08 - 24/11/15
Number of weekdays (Monday-Friday):	12
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 05 - HEALTH/F - CARE HOME (ELDERLY RESIDENTIAL)

PSVS

Calculation factor: 1 RESIDE

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. RESIDE	Trip Rate	No. Days	Ave. RESIDE	Trip Rate	No. Days	Ave. RESIDE	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	12	57	0.001	12	57	0.001	12	57	0.002
08:00 - 09:00	12	57	0.001	12	57	0.003	12	57	0.004
09:00 - 10:00	12	57	0.000	12	57	0.000	12	57	0.000
10:00 - 11:00	12	57	0.001	12	57	0.001	12	57	0.002
11:00 - 12:00	12	57	0.000	12	57	0.000	12	57	0.000
12:00 - 13:00	12	57	0.001	12	57	0.000	12	57	0.001
13:00 - 14:00	12	57	0.000	12	57	0.001	12	57	0.001
14:00 - 15:00	12	57	0.001	12	57	0.000	12	57	0.001
15:00 - 16:00	**12**	**57**	**0.003**	**12**	**57**	**0.004**	**12**	**57**	**0.007**
16:00 - 17:00	12	57	0.001	12	57	0.001	12	57	0.002
17:00 - 18:00	12	57	0.000	12	57	0.000	12	57	0.000
18:00 - 19:00	12	57	0.000	12	57	0.000	12	57	0.000
19:00 - 20:00	10	51	0.000	10	51	0.000	10	51	0.000
20:00 - 21:00	9	52	0.000	9	52	0.000	9	52	0.000
21:00 - 22:00	1	38	0.000	1	38	0.000	1	38	0.000
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.009			0.011			0.020

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	17 - 120 (units:)
Survey date date range:	01/01/08 - 24/11/15
Number of weekdays (Monday-Friday):	12
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 05 - HEALTH/F - CARE HOME (ELDERLY RESIDENTIAL)

CYCLISTS

Calculation factor: 1 RESIDE

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. RESIDE	Trip Rate	No. Days	Ave. RESIDE	Trip Rate	No. Days	Ave. RESIDE	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	12	57	0.003	12	57	0.004	12	57	0.007
08:00 - 09:00	12	57	0.003	12	57	0.001	12	57	0.004
09:00 - 10:00	12	57	0.003	12	57	0.001	12	57	0.004
10:00 - 11:00	12	57	0.000	12	57	0.000	12	57	0.000
11:00 - 12:00	12	57	0.000	12	57	0.000	12	57	0.000
12:00 - 13:00	12	57	0.001	12	57	0.001	12	57	0.002
13:00 - 14:00	12	57	0.000	12	57	0.001	12	57	0.001
14:00 - 15:00	12	57	0.001	**12**	**57**	**0.006**	12	57	0.007
15:00 - 16:00	**12**	**57**	**0.006**	12	57	0.006	**12**	**57**	**0.012**
16:00 - 17:00	12	57	0.000	12	57	0.001	12	57	0.001
17:00 - 18:00	12	57	0.006	12	57	0.006	12	57	0.012
18:00 - 19:00	12	57	0.000	12	57	0.000	12	57	0.000
19:00 - 20:00	10	51	0.000	10	51	0.000	10	51	0.000
20:00 - 21:00	9	52	0.002	9	52	0.000	9	52	0.002
21:00 - 22:00	1	38	0.000	1	38	0.000	1	38	0.000
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.025			0.027			0.052

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	17 - 120 (units:)
Survey date date range:	01/01/08 - 24/11/15
Number of weekdays (Monday-Friday):	12
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Calculation Reference: AUDIT-152303-161024-1059

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
Category : A - HOUSES PRIVATELY OWNED

VEHICLES

Selected regions and areas:

02	**SOUTH EAST**		
	EX	ESSEX	1 days
	WS	WEST SUSSEX	1 days
03	**SOUTH WEST**		
	DV	DEVON	1 days
06	**WEST MIDLANDS**		
	SH	SHROPSHIRE	1 days
07	**YORKSHIRE & NORTH LINCOLNSHIRE**		
	NE	NORTH EAST LINCOLNSHIRE	1 days
	NY	NORTH YORKSHIRE	1 days
08	**NORTH WEST**		
	CH	CHESHIRE	2 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Filtering Stage 2 selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter:	Number of dwellings
Actual Range:	108 to 432 (units:)
Range Selected by User:	100 to 4334 (units:)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/08 to 25/09/15

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	1 days
Tuesday	3 days
Thursday	2 days
Friday	2 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	8 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Suburban Area (PPS6 Out of Centre)	4
Edge of Town	4

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Residential Zone	5
No Sub Category	3

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category

Filtering Stage 3 selection:

Use Class:

C3	8 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

1,001 to 5,000	1 days
5,001 to 10,000	1 days
10,001 to 15,000	3 days
15,001 to 20,000	2 days
20,001 to 25,000	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

5,001 to 25,000	2 days
50,001 to 75,000	1 days
75,001 to 100,000	2 days
100,001 to 125,000	2 days
125,001 to 250,000	1 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	2 days
1.1 to 1.5	6 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

Yes	1 days
No	7 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

LIST OF SITES relevant to selection parameters

1 **CH-03-A-02** **HOUSES/FLATS** **CHESHIRE**
SYDNEY ROAD

CREWE
Edge of Town
Residential Zone
Total Number of dwellings: 174
Survey date: TUESDAY *14/10/08* *Survey Type: MANUAL*

2 **CH-03-A-06** **SEMI-DET./BUNGALOWS** **CHESHIRE**
CREWE ROAD

CREWE
Suburban Area (PPS6 Out of Centre)
No Sub Category
Total Number of dwellings: 129
Survey date: TUESDAY *14/10/08* *Survey Type: MANUAL*

3 **DV-03-A-02** **HOUSES & BUNGALOWS** **DEVON**
MILLHEAD ROAD

HONITON
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 116
Survey date: FRIDAY *25/09/15* *Survey Type: MANUAL*

4 **EX-03-A-01** **SEMI-DET.** **ESSEX**
MILTON ROAD
CORRINGHAM
STANFORD-LE-HOPE
Edge of Town
Residential Zone
Total Number of dwellings: 237
Survey date: TUESDAY *13/05/08* *Survey Type: MANUAL*

5 **NE-03-A-02** **SEMI DETACHED & DETACHED** **NORTH EAST LINCOLNSHIRE**
HANOVER WALK

SCUNTHORPE
Edge of Town
No Sub Category
Total Number of dwellings: 432
Survey date: MONDAY *12/05/14* *Survey Type: MANUAL*

6 **NY-03-A-06** **BUNGALOWS & SEMI DET.** **NORTH YORKSHIRE**
HORSEFAIR

BOROUGHBRIDGE
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 115
Survey date: FRIDAY *14/10/11* *Survey Type: MANUAL*

7 **SH-03-A-04** **TERRACED** **SHROPSHIRE**
ST MICHAEL'S STREET

SHREWSBURY
Suburban Area (PPS6 Out of Centre)
No Sub Category
Total Number of dwellings: 108
Survey date: THURSDAY *11/06/09* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

8 WS-03-A-04 MIXED HOUSES WEST SUSSEX
HILLS FARM LANE
BROADBRIDGE HEATH
HORSHAM
Edge of Town
Residential Zone
Total Number of dwellings: 151
Survey date: THURSDAY *11/12/14* *Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED

VEHICLES

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	8	183	0.064	8	183	0.251	8	183	0.315
08:00 - 09:00	8	183	0.127	**8**	**183**	**0.368**	8	183	0.495
09:00 - 10:00	8	183	0.139	8	183	0.153	8	183	0.292
10:00 - 11:00	8	183	0.142	8	183	0.179	8	183	0.321
11:00 - 12:00	8	183	0.139	8	183	0.145	8	183	0.284
12:00 - 13:00	8	183	0.172	8	183	0.163	8	183	0.335
13:00 - 14:00	8	183	0.161	8	183	0.138	8	183	0.299
14:00 - 15:00	8	183	0.164	8	183	0.183	8	183	0.347
15:00 - 16:00	8	183	0.291	8	183	0.209	8	183	0.500
16:00 - 17:00	8	183	0.283	8	183	0.173	8	183	0.456
17:00 - 18:00	**8**	**183**	**0.311**	8	183	0.199	**8**	**183**	**0.510**
18:00 - 19:00	8	183	0.232	8	183	0.172	8	183	0.404
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			2.225			2.333			4.558

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	108 - 432 (units:)
Survey date date range:	01/01/08 - 25/09/15
Number of weekdays (Monday-Friday):	8
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED

TAXIS

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	8	183	0.003	8	183	0.002	8	183	0.005
08:00 - 09:00	8	183	0.002	8	183	0.003	8	183	0.005
09:00 - 10:00	8	183	0.003	8	183	0.002	8	183	0.005
10:00 - 11:00	8	183	0.002	8	183	0.002	8	183	0.004
11:00 - 12:00	8	183	0.001	8	183	0.001	8	183	0.002
12:00 - 13:00	8	183	0.001	8	183	0.001	8	183	0.002
13:00 - 14:00	8	183	0.001	8	183	0.000	8	183	0.001
14:00 - 15:00	8	183	0.003	8	183	0.003	8	183	0.006
15:00 - 16:00	**8**	**183**	**0.007**	**8**	**183**	**0.007**	**8**	**183**	**0.014**
16:00 - 17:00	8	183	0.002	8	183	0.002	8	183	0.004
17:00 - 18:00	8	183	0.001	8	183	0.001	8	183	0.002
18:00 - 19:00	8	183	0.001	8	183	0.001	8	183	0.002
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.027			0.025			0.052

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	108 - 432 (units:)
Survey date date range:	01/01/08 - 25/09/15
Number of weekdays (Monday-Friday):	8
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED

OGVS

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	8	183	0.001	8	183	0.001	8	183	0.002
08:00 - 09:00	8	183	0.001	8	183	0.001	8	183	0.002
09:00 - 10:00	8	183	0.002	8	183	0.000	8	183	0.002
10:00 - 11:00	8	183	0.003	8	183	0.004	8	183	0.007
11:00 - 12:00	8	183	0.002	8	183	0.001	8	183	0.003
12:00 - 13:00	**8**	**183**	**0.004**	**8**	**183**	**0.005**	**8**	**183**	**0.009**
13:00 - 14:00	8	183	0.003	8	183	0.004	8	183	0.007
14:00 - 15:00	8	183	0.002	8	183	0.005	8	183	0.007
15:00 - 16:00	8	183	0.001	8	183	0.001	8	183	0.002
16:00 - 17:00	8	183	0.001	8	183	0.000	8	183	0.001
17:00 - 18:00	8	183	0.000	8	183	0.000	8	183	0.000
18:00 - 19:00	8	183	0.000	8	183	0.000	8	183	0.000
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.020			0.022			0.042

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	108 - 432 (units:)
Survey date date range:	01/01/08 - 25/09/15
Number of weekdays (Monday-Friday):	8
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED

PSVS

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	8	183	0.000	8	183	0.000	8	183	0.000
08:00 - 09:00	**8**	**183**	**0.001**	**8**	**183**	**0.001**	**8**	**183**	**0.002**
09:00 - 10:00	8	183	0.000	8	183	0.000	8	183	0.000
10:00 - 11:00	8	183	0.000	8	183	0.000	8	183	0.000
11:00 - 12:00	8	183	0.001	8	183	0.001	8	183	0.002
12:00 - 13:00	8	183	0.000	8	183	0.000	8	183	0.000
13:00 - 14:00	8	183	0.001	8	183	0.001	8	183	0.002
14:00 - 15:00	8	183	0.000	8	183	0.000	8	183	0.000
15:00 - 16:00	8	183	0.001	8	183	0.001	8	183	0.002
16:00 - 17:00	8	183	0.000	8	183	0.000	8	183	0.000
17:00 - 18:00	8	183	0.000	8	183	0.000	8	183	0.000
18:00 - 19:00	8	183	0.000	8	183	0.000	8	183	0.000
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.004			0.004			0.008

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	108 - 432 (units:)
Survey date date range:	01/01/08 - 25/09/15
Number of weekdays (Monday-Friday):	8
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED

CYCLISTS

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	8	183	0.007	8	183	0.010	8	183	0.017
08:00 - 09:00	8	183	0.001	8	183	0.007	8	183	0.008
09:00 - 10:00	8	183	0.003	8	183	0.002	8	183	0.005
10:00 - 11:00	8	183	0.003	8	183	0.005	8	183	0.008
11:00 - 12:00	8	183	0.004	8	183	0.002	8	183	0.006
12:00 - 13:00	8	183	0.005	8	183	0.003	8	183	0.008
13:00 - 14:00	8	183	0.001	8	183	0.004	8	183	0.005
14:00 - 15:00	8	183	0.003	8	183	0.003	8	183	0.006
15:00 - 16:00	8	183	0.007	8	183	0.005	8	183	0.012
16:00 - 17:00	8	183	0.006	8	183	0.003	8	183	0.009
17:00 - 18:00	**8**	**183**	**0.010**	**8**	**183**	**0.011**	**8**	**183**	**0.021**
18:00 - 19:00	8	183	0.008	8	183	0.005	8	183	0.013
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.058			0.060			0.118

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	108 - 432 (units:)
Survey date date range:	01/01/08 - 25/09/15
Number of weekdays (Monday-Friday):	8
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Calculation Reference: AUDIT-152303-161031-1054

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
Category : C - FLATS PRIVATELY OWNED

VEHICLES

Selected regions and areas:

02	**SOUTH EAST**		
	HC	HAMPSHIRE	1 days
	HF	HERTFORDSHIRE	1 days
	OX	OXFORDSHIRE	1 days
	SC	SURREY	1 days
03	**SOUTH WEST**		
	BR	BRISTOL CITY	1 days
	DC	DORSET	1 days
04	**EAST ANGLIA**		
	CA	CAMBRIDGESHIRE	1 days
	SF	SUFFOLK	1 days
05	**EAST MIDLANDS**		
	DS	DERBYSHIRE	1 days
	NR	NORTHAMPTONSHIRE	1 days
06	**WEST MIDLANDS**		
	ST	STAFFORDSHIRE	1 days
07	**YORKSHIRE & NORTH LINCOLNSHIRE**		
	RI	EAST RIDING OF YORKSHIRE	1 days
09	**NORTH**		
	CB	CUMBRIA	2 days
	TV	TEES VALLEY	2 days
10	**WALES**		
	DB	DENBIGHSHIRE	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Filtering Stage 2 selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter:	Number of dwellings
Actual Range:	8 to 102 (units:)
Range Selected by User:	6 to 215 (units:)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/08 to 18/12/14

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	3 days
Tuesday	2 days
Wednesday	7 days
Thursday	2 days
Friday	3 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	17 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Suburban Area (PPS6 Out of Centre)	14
Edge of Town	2
Neighbourhood Centre (PPS6 Local Centre)	1

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Residential Zone	11
Built-Up Zone	1
No Sub Category	5

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Filtering Stage 3 selection:

Use Class:

C3	17 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Filtering Stage 3 selection (Cont.):

Population within 1 mile:

1,001 to 5,000	3 days
10,001 to 15,000	5 days
15,001 to 20,000	1 days
20,001 to 25,000	3 days
25,001 to 50,000	5 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

5,001 to 25,000	1 days
25,001 to 50,000	1 days
50,001 to 75,000	5 days
100,001 to 125,000	1 days
125,001 to 250,000	5 days
250,001 to 500,000	4 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	4 days
1.1 to 1.5	13 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

No	17 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

LIST OF SITES relevant to selection parameters

1 **BR-03-C-01** **FLATS & TERRACED** **BRISTOL CITY**
CLARENCE ROAD

BRISTOL
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 102
Survey date: MONDAY *09/11/09* *Survey Type: MANUAL*

2 **CA-03-C-02** **BLOCK OF FLATS** **CAMBRIDGESHIRE**
WESTFIELD ROAD
NETHERTON
PETERBOROUGH
Suburban Area (PPS6 Out of Centre)
No Sub Category
Total Number of dwellings: 44
Survey date: TUESDAY *18/10/11* *Survey Type: MANUAL*

3 **CB-03-C-02** **BLOCK OF FLATS** **CUMBRIA**
BRIDGE LANE

PENRITH
Edge of Town
No Sub Category
Total Number of dwellings: 35
Survey date: WEDNESDAY *11/06/14* *Survey Type: MANUAL*

4 **CB-03-C-03** **FLATS & BUNGALOWS** **CUMBRIA**
LOUND STREET

KENDAL
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 33
Survey date: MONDAY *09/06/14* *Survey Type: MANUAL*

5 **DB-03-C-01** **FLATS IN HOUSES** **DENBIGHSHIRE**
RHYL ROAD

RHUDDLAN
Neighbourhood Centre (PPS6 Local Centre)
Residential Zone
Total Number of dwellings: 16
Survey date: FRIDAY *07/10/11* *Survey Type: MANUAL*

6 **DC-03-C-02** **FLATS IN BLOCKS** **DORSET**
PALM COURT
SPA ROAD
WEYMOUTH
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 14
Survey date: FRIDAY *28/03/14* *Survey Type: MANUAL*

7 **DS-03-C-01** **BLOCK OF FLATS** **DERBYSHIRE**
DRAGE STREET
LITTLE CHESTER
DERBY
Suburban Area (PPS6 Out of Centre)
No Sub Category
Total Number of dwellings: 8
Survey date: THURSDAY *25/06/09* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

8 **HC-03-C-02** **FLATS** **HAMPSHIRE**
WORTING ROAD

BASINGSTOKE
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 16
Survey date: THURSDAY *21/10/10* *Survey Type: MANUAL*

9 **HF-03-C-02** **FLATS** **HERTFORDSHIRE**
BRIDGE ROAD EAST

WELWYN GARDEN CITY
Suburban Area (PPS6 Out of Centre)
No Sub Category
Total Number of dwellings: 86
Survey date: WEDNESDAY *16/07/08* *Survey Type: MANUAL*

10 **NR-03-C-01** **BLOCK OF FLATS** **NORTHAMPTONSHIRE**
ROCKINGHAM ROAD

CORBY
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 20
Survey date: FRIDAY *21/11/08* *Survey Type: MANUAL*

11 **OX-03-C-01** **BLOCK OF FLATS** **OXFORDSHIRE**
OXFORD ROAD
COWLEY
OXFORD
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 14
Survey date: WEDNESDAY *20/10/10* *Survey Type: MANUAL*

12 **RI-03-C-01** **FLATS** **EAST RIDING OF YORKSHIRE**
465 PRIORY ROAD

HULL
Edge of Town
Residential Zone
Total Number of dwellings: 20
Survey date: TUESDAY *13/05/14* *Survey Type: MANUAL*

13 **SC-03-C-02** **FLATS** **SURREY**
CONSTITUTION HILL

WOKING
Suburban Area (PPS6 Out of Centre)
Built-Up Zone
Total Number of dwellings: 36
Survey date: WEDNESDAY *23/07/08* *Survey Type: MANUAL*

14 **SF-03-C-03** **BLOCKS OF FLATS** **SUFFOLK**
TOLLGATE LANE

BURY ST EDMUNDS
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 30
Survey date: WEDNESDAY *03/12/14* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

15 ST-03-C-01 BLOCKS OF FLATS STAFFORDSHIRE
ETRURIA COURT
HUMBERT ROAD
STOKE-ON-TRENT
Suburban Area (PPS6 Out of Centre)
No Sub Category
Total Number of dwellings: 33
Survey date: WEDNESDAY 26/11/08 Survey Type: MANUAL

16 TV-03-C-01 APARTMENTS BLOCKS TEES VALLEY
OXFORD ROAD
LINTHORPE
MIDDLESBROUGH
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 85
Survey date: MONDAY 06/10/08 Survey Type: MANUAL

17 TV-03-C-02 FLATS TEES VALLEY
ACKLAM ROAD
LINTHORPE
MIDDLESBROUGH
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 85
Survey date: WEDNESDAY 29/06/11 Survey Type: MANUAL

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 03 - RESIDENTIAL/C - FLATS PRIVATELY OWNED

VEHICLES

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	17	40	0.040	17	40	0.151	17	40	0.191
08:00 - 09:00	17	40	0.087	**17**	**40**	**0.276**	17	40	0.363
09:00 - 10:00	17	40	0.075	17	40	0.117	17	40	0.192
10:00 - 11:00	17	40	0.078	17	40	0.099	17	40	0.177
11:00 - 12:00	17	40	0.090	17	40	0.092	17	40	0.182
12:00 - 13:00	17	40	0.099	17	40	0.106	17	40	0.205
13:00 - 14:00	17	40	0.103	17	40	0.096	17	40	0.199
14:00 - 15:00	17	40	0.102	17	40	0.109	17	40	0.211
15:00 - 16:00	17	40	0.126	17	40	0.095	17	40	0.221
16:00 - 17:00	17	40	0.136	17	40	0.097	17	40	0.233
17:00 - 18:00	17	40	0.294	17	40	0.131	17	40	0.425
18:00 - 19:00	17	40	0.205	17	40	0.154	17	40	0.359
19:00 - 20:00	**2**	**15**	**0.333**	2	15	0.200	**2**	**15**	**0.533**
20:00 - 21:00	2	15	0.100	2	15	0.033	2	15	0.133
21:00 - 22:00	2	15	0.133	2	15	0.100	2	15	0.233
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			2.001			1.856			3.857

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	8 - 102 (units:)
Survey date date range:	01/01/08 - 18/12/14
Number of weekdays (Monday-Friday):	17
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/C - FLATS PRIVATELY OWNED

TAXIS

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	17	40	0.004	17	40	0.004	17	40	0.008
08:00 - 09:00	**17**	**40**	**0.007**	**17**	**40**	**0.007**	**17**	**40**	**0.014**
09:00 - 10:00	17	40	0.004	17	40	0.004	17	40	0.008
10:00 - 11:00	17	40	0.000	17	40	0.000	17	40	0.000
11:00 - 12:00	17	40	0.001	17	40	0.001	17	40	0.002
12:00 - 13:00	17	40	0.001	17	40	0.001	17	40	0.002
13:00 - 14:00	17	40	0.003	17	40	0.003	17	40	0.006
14:00 - 15:00	17	40	0.006	17	40	0.006	17	40	0.012
15:00 - 16:00	17	40	0.001	17	40	0.001	17	40	0.002
16:00 - 17:00	17	40	0.000	17	40	0.001	17	40	0.001
17:00 - 18:00	17	40	0.004	17	40	0.004	17	40	0.008
18:00 - 19:00	17	40	0.007	17	40	0.007	17	40	0.014
19:00 - 20:00	2	15	0.000	2	15	0.000	2	15	0.000
20:00 - 21:00	2	15	0.000	2	15	0.000	2	15	0.000
21:00 - 22:00	2	15	0.000	2	15	0.000	2	15	0.000
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.038			0.039			0.077

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	8 - 102 (units:)
Survey date date range:	01/01/08 - 18/12/14
Number of weekdays (Monday-Friday):	17
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/C - FLATS PRIVATELY OWNED

OGVS

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	**17**	**40**	**0.004**	**17**	**40**	**0.006**	**17**	**40**	**0.010**
08:00 - 09:00	17	40	0.003	17	40	0.003	17	40	0.006
09:00 - 10:00	17	40	0.001	17	40	0.001	17	40	0.002
10:00 - 11:00	17	40	0.001	17	40	0.001	17	40	0.002
11:00 - 12:00	17	40	0.004	17	40	0.004	17	40	0.008
12:00 - 13:00	17	40	0.004	17	40	0.004	17	40	0.008
13:00 - 14:00	17	40	0.001	17	40	0.001	17	40	0.002
14:00 - 15:00	17	40	0.004	17	40	0.001	17	40	0.005
15:00 - 16:00	17	40	0.001	17	40	0.003	17	40	0.004
16:00 - 17:00	17	40	0.001	17	40	0.001	17	40	0.002
17:00 - 18:00	17	40	0.000	17	40	0.000	17	40	0.000
18:00 - 19:00	17	40	0.001	17	40	0.000	17	40	0.001
19:00 - 20:00	2	15	0.000	2	15	0.000	2	15	0.000
20:00 - 21:00	2	15	0.000	2	15	0.000	2	15	0.000
21:00 - 22:00	2	15	0.000	2	15	0.000	2	15	0.000
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.025			0.025			0.050

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	8 - 102 (units:)
Survey date date range:	01/01/08 - 18/12/14
Number of weekdays (Monday-Friday):	17
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/C - FLATS PRIVATELY OWNED

PSVS

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	17	40	0.000	17	40	0.000	17	40	0.000
08:00 - 09:00	17	40	0.000	17	40	0.000	17	40	0.000
09:00 - 10:00	17	40	0.000	17	40	0.000	17	40	0.000
10:00 - 11:00	17	40	0.000	17	40	0.000	17	40	0.000
11:00 - 12:00	17	40	0.000	17	40	0.000	17	40	0.000
12:00 - 13:00	17	40	0.000	17	40	0.000	17	40	0.000
13:00 - 14:00	17	40	0.000	17	40	0.000	17	40	0.000
14:00 - 15:00	17	40	0.000	17	40	0.000	17	40	0.000
15:00 - 16:00	17	40	0.000	17	40	0.000	17	40	0.000
16:00 - 17:00	17	40	0.000	17	40	0.000	17	40	0.000
17:00 - 18:00	**17**	**40**	**0.001**	**17**	**40**	**0.001**	**17**	**40**	**0.002**
18:00 - 19:00	17	40	0.000	17	40	0.000	17	40	0.000
19:00 - 20:00	2	15	0.000	2	15	0.000	2	15	0.000
20:00 - 21:00	2	15	0.000	2	15	0.000	2	15	0.000
21:00 - 22:00	2	15	0.000	2	15	0.000	2	15	0.000
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.001			0.001			0.002

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	8 - 102 (units:)
Survey date date range:	01/01/08 - 18/12/14
Number of weekdays (Monday-Friday):	17
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/C - FLATS PRIVATELY OWNED

CYCLISTS

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	17	40	0.004	17	40	0.007	17	40	0.011
08:00 - 09:00	17	40	0.001	**17**	**40**	**0.010**	17	40	0.011
09:00 - 10:00	17	40	0.003	17	40	0.007	17	40	0.010
10:00 - 11:00	17	40	0.001	17	40	0.003	17	40	0.004
11:00 - 12:00	17	40	0.001	17	40	0.009	17	40	0.010
12:00 - 13:00	17	40	0.006	17	40	0.003	17	40	0.009
13:00 - 14:00	17	40	0.007	17	40	0.010	17	40	0.017
14:00 - 15:00	17	40	0.006	17	40	0.009	17	40	0.015
15:00 - 16:00	17	40	0.007	17	40	0.006	17	40	0.013
16:00 - 17:00	**17**	**40**	**0.013**	17	40	0.007	**17**	**40**	**0.020**
17:00 - 18:00	17	40	0.006	17	40	0.003	17	40	0.009
18:00 - 19:00	17	40	0.010	17	40	0.000	17	40	0.010
19:00 - 20:00	2	15	0.000	2	15	0.000	2	15	0.000
20:00 - 21:00	2	15	0.000	2	15	0.000	2	15	0.000
21:00 - 22:00	2	15	0.000	2	15	0.000	2	15	0.000
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.065			0.074			0.139

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	8 - 102 (units:)
Survey date date range:	01/01/08 - 18/12/14
Number of weekdays (Monday-Friday):	17
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Calculation Reference: AUDIT-152303-161024-1045

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 04 - EDUCATION
Category : A - PRIMARY

VEHICLES

Selected regions and areas:

02	**SOUTH EAST**		
	BU	BUCKINGHAMSHIRE	1 days
	EX	ESSEX	1 days
	HC	HAMPSHIRE	1 days
	SC	SURREY	1 days
03	**SOUTH WEST**		
	BR	BRISTOL CITY	1 days
04	**EAST ANGLIA**		
	SF	SUFFOLK	2 days
05	**EAST MIDLANDS**		
	DS	DERBYSHIRE	1 days
	LE	LEICESTERSHIRE	2 days
	LN	LINCOLNSHIRE	1 days
	NR	NORTHAMPTONSHIRE	1 days
06	**WEST MIDLANDS**		
	WM	WEST MIDLANDS	1 days
07	**YORKSHIRE & NORTH LINCOLNSHIRE**		
	NE	NORTH EAST LINCOLNSHIRE	1 days
	WY	WEST YORKSHIRE	2 days
08	**NORTH WEST**		
	CH	CHESHIRE	1 days
	GM	GREATER MANCHESTER	1 days
	MS	MERSEYSIDE	1 days
09	**NORTH**		
	TW	TYNE & WEAR	1 days
10	**WALES**		
	MT	MERTHYR TYDFIL	1 days
	WR	WREXHAM	1 days
11	**SCOTLAND**		
	DU	DUNDEE CITY	1 days
	FA	FALKIRK	1 days
	FI	FIFE	1 days
	SR	STIRLING	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Filtering Stage 2 selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter:	Number of pupils
Actual Range:	79 to 657 (units:)
Range Selected by User:	79 to 657 (units:)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/08 to 30/11/15

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	7 days
Tuesday	5 days
Wednesday	7 days
Thursday	6 days
Friday	1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	26 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Edge of Town Centre	2
Suburban Area (PPS6 Out of Centre)	8
Edge of Town	10
Neighbourhood Centre (PPS6 Local Centre)	6

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Industrial Zone	1
Residential Zone	20
Village	4
No Sub Category	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Filtering Stage 3 selection:

Use Class:

D1	26 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Filtering Stage 3 selection (Cont.):

Population within 1 mile:

1,000 or Less	1 days
1,001 to 5,000	3 days
5,001 to 10,000	4 days
10,001 to 15,000	4 days
15,001 to 20,000	6 days
20,001 to 25,000	4 days
25,001 to 50,000	4 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

5,001 to 25,000	1 days
50,001 to 75,000	3 days
75,001 to 100,000	6 days
100,001 to 125,000	1 days
125,001 to 250,000	6 days
250,001 to 500,000	7 days
500,001 or More	2 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	10 days
1.1 to 1.5	16 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

Yes	4 days
No	22 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

LIST OF SITES relevant to selection parameters

1 **BR-04-A-01** **PRIMARY SCHOOL** **BRISTOL CITY**
SCHOOL CLOSE
WHITCHURCH
BRISTOL
Edge of Town
Residential Zone
Total Number of pupils: 208
Survey date: TUESDAY *22/09/15* *Survey Type: MANUAL*

2 **BU-04-A-01** **PRIMARY SCHOOL** **BUCKINGHAMSHIRE**
LOWER ROAD
STOKE MANDEVILLE
NEAR AYLESBURY
Neighbourhood Centre (PPS6 Local Centre)
Village
Total Number of pupils: 208
Survey date: WEDNESDAY *01/10/14* *Survey Type: MANUAL*

3 **CH-04-A-01** **PRIMARY SCHOOL** **CHESHIRE**
WESTON GROVE
UPTON
CHESTER
Edge of Town
Residential Zone
Total Number of pupils: 219
Survey date: MONDAY *17/11/14* *Survey Type: MANUAL*

4 **DS-04-A-01** **PRIMARY SCHOOL** **DERBYSHIRE**
VICARAGE ROAD
MICKLEOVER
DERBY
Edge of Town
Residential Zone
Total Number of pupils: 387
Survey date: THURSDAY *25/06/15* *Survey Type: MANUAL*

5 **DU-04-A-01** **PRIMARY SCHOOL** **DUNDEE CITY**
FALKLAND CRESCENT
BROUGHTY FERRY
DUNDEE
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of pupils: 412
Survey date: MONDAY *21/05/12* *Survey Type: MANUAL*

6 **EX-04-A-01** **PRIMARY SCHOOL** **ESSEX**
THE STREET
ROXWELL
NEAR CHELMSFORD
Neighbourhood Centre (PPS6 Local Centre)
Village
Total Number of pupils: 79
Survey date: TUESDAY *05/11/13* *Survey Type: MANUAL*

7 **FA-04-A-03** **PRIMARY SCHOOL** **FALKIRK**
GLENDEVON DRIVE
MADDISTON
FALKIRK
Edge of Town
Residential Zone
Total Number of pupils: 452
Survey date: MONDAY *03/06/13* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

8 **FI-04-A-01** **PRIMARY SCHOOL** **FIFE**
NORTHBANK ROAD
CAIRNEYHILL
NEAR DUNFERMLINE
Neighbourhood Centre (PPS6 Local Centre)
Village
Total Number of pupils: 285
Survey date: WEDNESDAY *27/05/15* *Survey Type: MANUAL*

9 **GM-04-A-01** **PRIMARY SCHOOL** **GREATER MANCHESTER**
ROCH MILLS CRESCENT

ROCHDALE
Edge of Town
Residential Zone
Total Number of pupils: 457
Survey date: TUESDAY *20/10/15* *Survey Type: MANUAL*

10 **HC-04-A-05** **PRIMARY SCHOOL** **HAMPSHIRE**
HAVANT ROAD

HAYLING ISLAND
Edge of Town
Residential Zone
Total Number of pupils: 550
Survey date: MONDAY *30/11/15* *Survey Type: MANUAL*

11 **LE-04-A-01** **PRIMARY SCHOOL** **LEICESTERSHIRE**
SLATER STREET
FROG ISLAND
LEICESTER
Edge of Town Centre
Industrial Zone
Total Number of pupils: 92
Survey date: WEDNESDAY *26/09/12* *Survey Type: MANUAL*

12 **LE-04-A-02** **PRIMARY SCHOOL** **LEICESTERSHIRE**
BEAUFORT WAY
OADBY
LEICESTER
Edge of Town
Residential Zone
Total Number of pupils: 380
Survey date: THURSDAY *30/10/14* *Survey Type: MANUAL*

13 **LN-04-A-01** **PRIMARY SCHOOL** **LINCOLNSHIRE**
GONERBY HILL FOOT

GRANTHAM
Neighbourhood Centre (PPS6 Local Centre)
Residential Zone
Total Number of pupils: 312
Survey date: WEDNESDAY *12/06/13* *Survey Type: MANUAL*

14 **MS-04-A-02** **PRIMARY SCHOOL** **MERSEYSIDE**
BOOKER AVENUE
ALVERTON
LIVERPOOL
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of pupils: 264
Survey date: THURSDAY *13/06/13* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

15 **MT-04-A-01** **PRIMARY SCHOOL** **MERTHYR TYDFIL**
BRECON ROAD

MERTHYR TYDFIL
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of pupils: 184
Survey date: FRIDAY *18/10/13* *Survey Type: MANUAL*

16 **NE-04-A-01** **PRIMARY SCHOOL** **NORTH EAST LINCOLNSHIRE**
SUNNINGDALE ROAD

SCUNTHORPE
Edge of Town
Residential Zone
Total Number of pupils: 147
Survey date: TUESDAY *20/05/14* *Survey Type: MANUAL*

17 **NR-04-A-02** **PRIMARY SCHOOL** **NORTHAMPTONSHIRE**
DAYRELL ROAD

NORTHAMPTON
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of pupils: 400
Survey date: WEDNESDAY *26/11/08* *Survey Type: MANUAL*

18 **SC-04-A-01** **PRIMARY SCHOOL** **SURREY**
SCHOOL LANE
PIRBRIGHT
NEAR WOKING
Neighbourhood Centre (PPS6 Local Centre)
Village
Total Number of pupils: 414
Survey date: THURSDAY *22/11/12* *Survey Type: MANUAL*

19 **SF-04-A-02** **PRIMARY SCHOOL** **SUFFOLK**
SIDEGATE LANE

IPSWICH
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of pupils: 657
Survey date: WEDNESDAY *21/05/08* *Survey Type: MANUAL*

20 **SF-04-A-03** **PRIMARY SCHOOL** **SUFFOLK**
ENSTONE ROAD
KIRKLEY
LOWESTOFT
Neighbourhood Centre (PPS6 Local Centre)
Residential Zone
Total Number of pupils: 234
Survey date: WEDNESDAY *10/12/14* *Survey Type: MANUAL*

21 **SR-04-A-01** **PRIMARY SCHOOL** **STIRLING**
PULLAR AVENUE
BRIDGE OF ALLAN
STIRLING
Edge of Town
Residential Zone
Total Number of pupils: 386
Survey date: MONDAY *16/06/14* *Survey Type: MANUAL*

22 **TW-04-A-01** **PRIMARY SCHOOL** **TYNE & WEAR**
GLYNWOOD GARDENS

GATESHEAD
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of pupils: 260
Survey date: MONDAY *07/10/13* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

23 **WM-04-A-02** **PRIMARY SCHOOL** **WEST MIDLANDS**
HAZEL ROAD
RUBERY
BIRMINGHAM
Edge of Town
Residential Zone
Total Number of pupils: 234
Survey date: TUESDAY *10/11/15* *Survey Type: MANUAL*

24 **WR-04-A-02** **PRIMARY SCHOOL** **WREXHAM**
BODHYFRYD

WREXHAM
Edge of Town Centre
No Sub Category
Total Number of pupils: 278
Survey date: THURSDAY *13/11/14* *Survey Type: MANUAL*

25 **WY-04-A-01** **PRIMARY SCHOOL** **WEST YORKSHIRE**
SHAKESPEARE AVENUE

LEEDS
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of pupils: 370
Survey date: THURSDAY *19/09/13* *Survey Type: MANUAL*

26 **WY-04-A-02** **PRIMARY SCHOOL** **WEST YORKSHIRE**
TOWN STREET

LEEDS
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of pupils: 621
Survey date: MONDAY *19/10/15* *Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 04 - EDUCATION/A - PRIMARY

VEHICLES

Calculation factor: 1 PUPILS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. PUPILS	Trip Rate	No. Days	Ave. PUPILS	Trip Rate	No. Days	Ave. PUPILS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00	1	312	0.000	1	312	0.000	1	312	0.000
06:00 - 07:00	1	312	0.013	1	312	0.003	1	312	0.016
07:00 - 08:00	26	327	0.048	26	327	0.012	26	327	0.060
08:00 - 09:00	**26**	**327**	**0.275**	26	327	0.196	**26**	**327**	**0.471**
09:00 - 10:00	26	327	0.037	26	327	0.062	26	327	0.099
10:00 - 11:00	26	327	0.014	26	327	0.012	26	327	0.026
11:00 - 12:00	26	327	0.027	26	327	0.020	26	327	0.047
12:00 - 13:00	26	327	0.025	26	327	0.030	26	327	0.055
13:00 - 14:00	26	327	0.017	26	327	0.025	26	327	0.042
14:00 - 15:00	26	327	0.082	26	327	0.022	26	327	0.104
15:00 - 16:00	26	327	0.133	**26**	**327**	**0.204**	26	327	0.337
16:00 - 17:00	26	327	0.048	26	327	0.083	26	327	0.131
17:00 - 18:00	26	327	0.027	26	327	0.042	26	327	0.069
18:00 - 19:00	24	329	0.018	24	329	0.025	24	329	0.043
19:00 - 20:00	2	295	0.002	2	295	0.027	2	295	0.029
20:00 - 21:00	1	312	0.000	1	312	0.032	1	312	0.032
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.766			0.795			1.561

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	79 - 657 (units:)
Survey date date range:	01/01/08 - 30/11/15
Number of weekdays (Monday-Friday):	26
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 04 - EDUCATION/A - PRIMARY

TAXIS

Calculation factor: 1 PUPILS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. PUPILS	Trip Rate	No. Days	Ave. PUPILS	Trip Rate	No. Days	Ave. PUPILS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00	1	312	0.000	1	312	0.000	1	312	0.000
06:00 - 07:00	1	312	0.000	1	312	0.000	1	312	0.000
07:00 - 08:00	26	327	0.000	26	327	0.000	26	327	0.000
08:00 - 09:00	**26**	**327**	**0.005**	**26**	**327**	**0.005**	**26**	**327**	**0.010**
09:00 - 10:00	26	327	0.001	26	327	0.001	26	327	0.002
10:00 - 11:00	26	327	0.000	26	327	0.000	26	327	0.000
11:00 - 12:00	26	327	0.001	26	327	0.000	26	327	0.001
12:00 - 13:00	26	327	0.001	26	327	0.001	26	327	0.002
13:00 - 14:00	26	327	0.000	26	327	0.000	26	327	0.000
14:00 - 15:00	26	327	0.003	26	327	0.000	26	327	0.003
15:00 - 16:00	26	327	0.002	26	327	0.004	26	327	0.006
16:00 - 17:00	26	327	0.000	26	327	0.000	26	327	0.000
17:00 - 18:00	26	327	0.000	26	327	0.000	26	327	0.000
18:00 - 19:00	24	329	0.000	24	329	0.000	24	329	0.000
19:00 - 20:00	2	295	0.000	2	295	0.000	2	295	0.000
20:00 - 21:00	1	312	0.000	1	312	0.000	1	312	0.000
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.013			0.011			0.024

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	79 - 657 (units:)
Survey date date range:	01/01/08 - 30/11/15
Number of weekdays (Monday-Friday):	26
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 04 - EDUCATION/A - PRIMARY

OGVS

Calculation factor: 1 PUPILS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. PUPILS	Trip Rate	No. Days	Ave. PUPILS	Trip Rate	No. Days	Ave. PUPILS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00	1	312	0.000	1	312	0.000	1	312	0.000
06:00 - 07:00	**1**	**312**	**0.003**	**1**	**312**	**0.003**	**1**	**312**	**0.006**
07:00 - 08:00	26	327	0.000	26	327	0.000	26	327	0.000
08:00 - 09:00	26	327	0.000	26	327	0.000	26	327	0.000
09:00 - 10:00	26	327	0.001	26	327	0.001	26	327	0.002
10:00 - 11:00	26	327	0.000	26	327	0.000	26	327	0.000
11:00 - 12:00	26	327	0.000	26	327	0.001	26	327	0.001
12:00 - 13:00	26	327	0.000	26	327	0.000	26	327	0.000
13:00 - 14:00	26	327	0.000	26	327	0.000	26	327	0.000
14:00 - 15:00	26	327	0.000	26	327	0.000	26	327	0.000
15:00 - 16:00	26	327	0.000	26	327	0.000	26	327	0.000
16:00 - 17:00	26	327	0.000	26	327	0.000	26	327	0.000
17:00 - 18:00	26	327	0.000	26	327	0.000	26	327	0.000
18:00 - 19:00	24	329	0.000	24	329	0.000	24	329	0.000
19:00 - 20:00	2	295	0.000	2	295	0.000	2	295	0.000
20:00 - 21:00	1	312	0.000	1	312	0.000	1	312	0.000
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.004			0.005			0.009

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	79 - 657 (units:)
Survey date date range:	01/01/08 - 30/11/15
Number of weekdays (Monday-Friday):	26
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 04 - EDUCATION/A - PRIMARY

PSVS

Calculation factor: 1 PUPILS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. PUPILS	Trip Rate	No. Days	Ave. PUPILS	Trip Rate	No. Days	Ave. PUPILS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00	1	312	0.000	1	312	0.000	1	312	0.000
06:00 - 07:00	1	312	0.000	1	312	0.000	1	312	0.000
07:00 - 08:00	26	327	0.000	26	327	0.000	26	327	0.000
08:00 - 09:00	**26**	**327**	**0.001**	26	327	0.001	**26**	**327**	**0.002**
09:00 - 10:00	26	327	0.001	26	327	0.001	26	327	0.002
10:00 - 11:00	26	327	0.000	26	327	0.000	26	327	0.000
11:00 - 12:00	26	327	0.001	26	327	0.001	26	327	0.002
12:00 - 13:00	26	327	0.000	26	327	0.001	26	327	0.001
13:00 - 14:00	26	327	0.000	26	327	0.000	26	327	0.000
14:00 - 15:00	26	327	0.001	26	327	0.000	26	327	0.001
15:00 - 16:00	26	327	0.001	**26**	**327**	**0.001**	26	327	0.002
16:00 - 17:00	26	327	0.000	26	327	0.000	26	327	0.000
17:00 - 18:00	26	327	0.000	26	327	0.000	26	327	0.000
18:00 - 19:00	24	329	0.000	24	329	0.000	24	329	0.000
19:00 - 20:00	2	295	0.000	2	295	0.000	2	295	0.000
20:00 - 21:00	1	312	0.000	1	312	0.000	1	312	0.000
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.005			0.005			0.010

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	79 - 657 (units:)
Survey date date range:	01/01/08 - 30/11/15
Number of weekdays (Monday-Friday):	26
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 04 - EDUCATION/A - PRIMARY

CYCLISTS

Calculation factor: 1 PUPILS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. PUPILS	Trip Rate	No. Days	Ave. PUPILS	Trip Rate	No. Days	Ave. PUPILS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00	1	312	0.000	1	312	0.000	1	312	0.000
06:00 - 07:00	1	312	0.000	1	312	0.000	1	312	0.000
07:00 - 08:00	26	327	0.001	26	327	0.000	26	327	0.001
08:00 - 09:00	**26**	**327**	**0.015**	26	327	0.002	**26**	**327**	**0.017**
09:00 - 10:00	26	327	0.002	26	327	0.003	26	327	0.005
10:00 - 11:00	26	327	0.000	26	327	0.000	26	327	0.000
11:00 - 12:00	26	327	0.000	26	327	0.000	26	327	0.000
12:00 - 13:00	26	327	0.000	26	327	0.001	26	327	0.001
13:00 - 14:00	26	327	0.000	26	327	0.000	26	327	0.000
14:00 - 15:00	26	327	0.001	26	327	0.000	26	327	0.001
15:00 - 16:00	26	327	0.004	**26**	**327**	**0.013**	26	327	0.017
16:00 - 17:00	26	327	0.001	26	327	0.004	26	327	0.005
17:00 - 18:00	26	327	0.000	26	327	0.001	26	327	0.001
18:00 - 19:00	24	329	0.000	24	329	0.000	24	329	0.000
19:00 - 20:00	2	295	0.000	2	295	0.000	2	295	0.000
20:00 - 21:00	1	312	0.000	1	312	0.000	1	312	0.000
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.024			0.024			0.048

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	79 - 657 (units:)
Survey date date range:	01/01/08 - 30/11/15
Number of weekdays (Monday-Friday):	26
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Appendix B – Trip Generation Calculations

Land Use	0700 to 0800			AM Peak			0900 to 1000			1600 to 1700			PM Peak			1800 to 1900		
	IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT
Dwellings	115	395	510	241	616	856	247	306	553	473	298	770	573	358	931	416	310	726
To Emp	67	229	295	61	157	218	41	51	92	123	78	201	215	134	349	103	77	180
To Shop	3	11	14	9	24	34	55	68	122	75	47	122	70	44	114	62	46	108
Leisure	9	33	42	15	39	54	57	70	127	124	78	203	148	92	240	167	124	291
Edu	20	68	87	121	309	430	28	35	64	48	30	78	25	15	40	7	6	13
Other	16	55	71	34	87	121	66	82	149	102	65	167	116	72	188	76	57	134
Employment																		
Primary Education	20	5	25	116	82	198	16	26	42	20	35	55	11	18	29	8	11	18
Secondary Education				0	0	0							0	0	0			
Care Home	12	5	17	7	6	12	6	2	8	5	8	13	4	8	12	5	7	12
TOTAL	147	405	552	363	704	1067	268	334	603	498	341	838	589	384	973	429	327	756

Breakdown of Journey Purpose

To Emp	58%	58%	58%	25%	25%	25%	17%	17%	17%	26%	26%	26%	37%	37%	37%	25%	25%	25%
To Shop	3%	3%	3%	4%	4%	4%	22%	22%	22%	16%	16%	16%	12%	12%	12%	15%	15%	15%
Leisure	8%	8%	8%	6%	6%	6%	23%	23%	23%	26%	26%	26%	26%	26%	26%	40%	40%	40%
Edu	17%	17%	17%	50%	50%	50%	11%	11%	11%	10%	10%	10%	4%	4%	4%	2%	2%	2%
Other	14%	14%	14%	14%	14%	14%	27%	27%	27%	22%	22%	22%	20%	20%	20%	18%	18%	18%

INTERNALISATION

Land Use	0700 to 0800			AM Peak			0900 to 1000			1600 to 1700			PM Peak			1800 to 1900		
	IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT
Dwellings	-18	-5	-23	-97	-68	-165	-26	-32	-58	-26	-43	-68	-18	-28	-46	-15	-21	-36
To Emp																		
To Shop	-1	-2	-3	-2	-5	-7	-11	-14	-24	-15	-9	-24	-14	-9	-23	-12	-9	-22
Leisure	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edu	-4	-16	-20	-66	-92	-158	-21	-12	-33	-28	-16	-44	-14	-9	-23	-8	-6	-14
Other																		
Employment																		
Primary Education	-16	-4	-20	-92	-66	-158	-12	-21	-33	-16	-28	-44	-9	-14	-23	-6	-8	-14
Secondary Education													0	0	0			
Care Home																		
TOTAL	-34	-9	-43	-190	-134	-323	-38	-53	-91	-42	-71	-112	-27	-42	-69	-21	-29	-51

EXTERNAL Traffic Generation

Land Use	0700 to 0800			AM Peak			0900 to 1000			1600 to 1700			PM Peak			1800 to 1900		
	IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT
Dwellings	97	390	487	144	548	691	221	274	495	447	255	702	555	330	885	401	289	690
To Emp	67	229	295	61	157	218	41	51	92	123	78	201	215	134	349	103	77	180
To Shop	3	9	11	8	19	27	44	54	98	60	38	97	56	35	91	50	37	86
Leisure	9	33	42	15	39	54	57	70	127	124	78	203	148	92	240	167	124	291
Edu	16	52	67	55	217	272	8	23	30	20	14	34	11	6	17	-1	0	-1
Other	16	55	71	34	87	121	66	82	149	102	65	167	116	72	188	76	57	134
Employment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Primary Education	4	1	5	23	16	40	3	5	8	4	7	11	2	4	6	2	2	4
Secondary Education	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Care Home	12	5	17	7	6	12	6	2	8	5	8	13	4	8	12	5	7	12
TOTAL	112	396	509	173	570	743	230	282	512	456	270	726	562	341	904	407	298	705

	0700 to 0800			0800 to 0900			0900 to 1000			1600 to 1700			1700 to 1800			1800 to 1900		
	IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT
External with 12% PTP Dicount	99	349	448	153	502	654	202	248	450	401	238	639	495	300	795	358	262	621

APPENDIX D: DISTRIBUTION

place of work : 2011 census merged local authority district	E02003098 : South Gloucestershire 009	E02003101 : South Gloucestershire 012	Total	No Link	With Link
Hartlepool	0	0			
Middlesbrough	0	0			
Redcar and Cleveland	0	0			
Stockton-on-Tees	0	0			
Darlington	0	0			
County Durham	0	0			
Northumberland	0	0			
Gateshead	0	0			
Newcastle upon Tyne	0	0			
North Tyneside	1	0	1		
South Tyneside	0	0			
Sunderland	0	0			
Halton	0	1	1		
Warrington	1	1	2		
Blackburn with Darwen	0	1	1		
Blackpool	0	0			
Cheshire East	2	0	2		
Cheshire West and Chester	1	0	1		
Allerdale	0	0			
Barrow-in-Furness	0	0			
Carlisle	0	1	1		
Copeland	0	0			
Eden	1	0	1		
South Lakeland	0	0			
Burnley	0	0			
Chorley	0	0			
Fylde	0	0			
Hyndburn	0	0			
Lancaster	0	0			
Pendle	0	0			
Preston	0	1	1		
Ribble Valley	0	0			
Rossendale	0	0			
South Ribble	0	0			
West Lancashire	1	1	2		
Wyre	0	1	1		
Bolton	1	0	1		
Bury	0	0			
Manchester	20	32	52		
Oldham	0	0			
Rochdale	0	1	1		
Salford	1	0	1		
Stockport	0	0			
Tameside	0	0			
Trafford	0	1	1		
Wigan	2	1	3		
Knowsley	0	0			
Liverpool	0	1	1		
St. Helens	0	1	1		
Sefton	0	0			
Wirral	0	0			
Kingston upon Hull, City of	0	0			
East Riding of Yorkshire	0	0			

North East Lincolnshire	0	0			
North Lincolnshire	0	0			
York	0	0			
Craven	0	0			
Hambleton	0	0			
Harrogate	0	0			
Richmondshire	0	0			
Ryedale	0	0			
Scarborough	0	0			
Selby	0	0			
Barnsley	0	0			
Doncaster	0	0			
Rotherham	0	0			
Sheffield	0	0			
Bradford	0	2	2		
Calderdale	1	10	11		
Kirklees	0	0			
Leeds	3	2	5		
Wakefield	0	1	1		
Derby	0	1	1		
Leicester	0	0			
Rutland	0	0			
Nottingham	0	0			
Amber Valley	0	0			
Bolsover	0	0			
Chesterfield	0	0			
Derbyshire Dales	0	0			
Erewash	0	0			
High Peak	0	1	1		
North East Derbyshire	0	0			
South Derbyshire	0	0			
Blaby	1	0	1		
Charnwood	0	1	1		
Harborough	0	0			
Hinckley and Bosworth	0	0			
Melton	0	0			
North West Leicestershire	0	0			
Oadby and Wigston	1	0	1		
Boston	0	1	1		
East Lindsey	0	0			
Lincoln	0	0			
North Kesteven	0	0			
South Holland	0	0			
South Kesteven	0	0			
West Lindsey	0	0			
Corby	0	0			
Daventry	0	0			
East Northamptonshire	0	0			
Kettering	0	0			
Northampton	1	2	3		
South Northamptonshire	6	9	15		
Wellingborough	0	0			
Ashfield	0	1	1		
Bassetlaw	0	0			
Broxtowe	0	0			
Gedling	0	0			

Mansfield	0	0			
Newark and Sherwood	0	0			
Rushcliffe	0	1	1		
Herefordshire, County of	1	1	2		
Telford and Wrekin	0	0			
Stoke-on-Trent	0	1	1		
Shropshire	0	0			
Cannock Chase	0	0			
East Staffordshire	1	0	1		
Lichfield	0	0			
Newcastle-under-Lyme	1	0	1		
South Staffordshire	0	0			
Stafford	2	0	2		
Staffordshire Moorlands	1	0	1		
Tamworth	0	0			
North Warwickshire	0	0			
Nuneaton and Bedworth	0	1	1		
Rugby	13	14	27		
Stratford-on-Avon	1	0	1		
Warwick	1	1	2		
Bromsgrove	0	0			
Malvern Hills	1	1	2		
Redditch	0	0			
Worcester	2	1	3		
Wychavon	1	1	2		
Wyre Forest	0	0			
Birmingham	5	4	9		
Coventry	0	0			
Dudley	0	0			
Sandwell	0	0			
Solihull	2	2	4		
Walsall	2	2	4		
Wolverhampton	1	2	3		
Peterborough	1	0	1		
Luton	4	2	6		
Southend-on-Sea	1	0	1		
Thurrock	0	0			
Bedford	0	0			
Central Bedfordshire	0	0			
Cambridge	0	0			
East Cambridgeshire	0	0			
Fenland	0	0			
Huntingdonshire	1	0	1		
South Cambridgeshire	0	0			
Basildon	0	0			
Braintree	0	1	1		
Brentwood	0	1	1		
Castle Point	0	0			
Chelmsford	1	0	1		
Colchester	0	1	1		
Epping Forest	0	0			
Harlow	1	0	1		
Maldon	0	1	1		
Rochford	0	0			
Tendring	0	0			
Uttlesford	1	1	2		

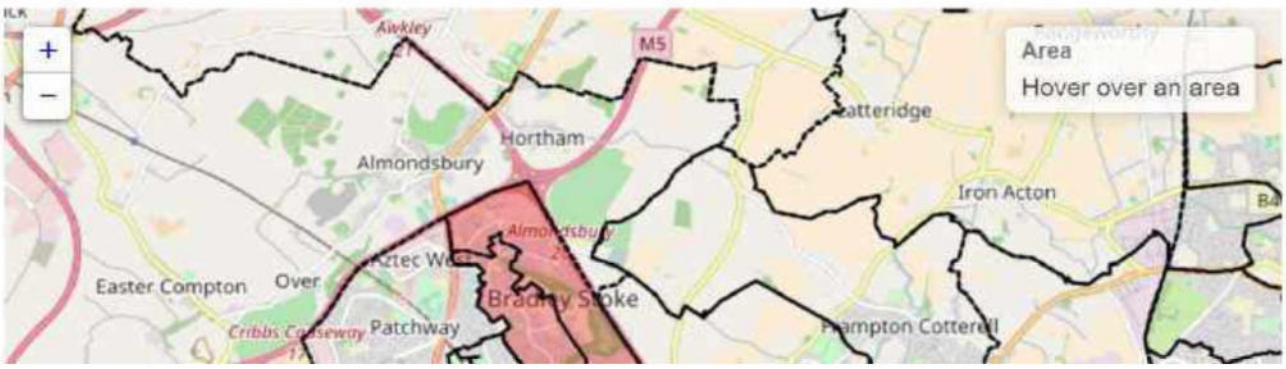
Broxbourne	1	0	1		
Dacorum	1	1	2		
East Hertfordshire	0	0			
Hertsmere	0	0			
North Hertfordshire	0	0			
St Albans	1	0	1		
Stevenage	0	0			
Three Rivers	1	0	1		
Watford	0	2	2		
Welwyn Hatfield	1	1	2		
Breckland	0	0			
Broadland	1	0	1		
Great Yarmouth	0	0			
King's Lynn and West Norfolk	0	2	2		
North Norfolk	0	0			
Norwich	0	0			
South Norfolk	0	0			
Babergh	0	0			
Forest Heath	0	0			
Ipswich	1	0	1		
Mid Suffolk	0	1	1		
St Edmundsbury	0	1	1		
Suffolk Coastal	0	0			
Waveney	0	0			
Barking and Dagenham	0	0			
Barnet	2	3	5		
Bexley	0	0			
Brent	0	0			
Bromley	0	0			
Camden	0	1	1		
Croydon	0	1	1		
Ealing	0	0			
Enfield	0	0			
Greenwich	0	0			
Hackney	0	0			
Hammersmith and Fulham	1	0	1		
Haringey	0	0			
Harrow	2	0	2		
Havering	0	0			
Hillingdon	2	4	6		
Hounslow	1	0	1		
Islington	0	3	3		
Kensington and Chelsea	1	0	1		
Kingston upon Thames	0	0			
Lambeth	0	0			
Lewisham	0	0			
Merton	0	0			
Newham	0	0			
Redbridge	1	0	1		
Richmond upon Thames	0	0			
Southwark	0	0			
Sutton	1	1	2		
Tower Hamlets	0	1	1		
Waltham Forest	0	0			
Wandsworth	0	0			
Westminster,City of London	7	15	22		

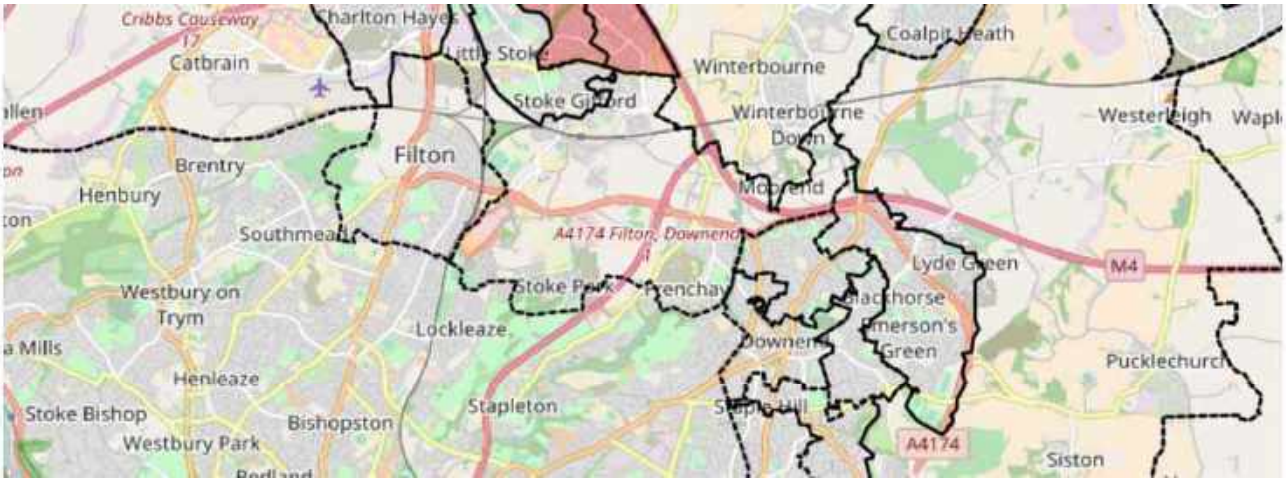
Medway	1	1	2		
Bracknell Forest	0	3	3		
West Berkshire	1	5	6		
Reading	4	7	11		
Slough	8	4	12		
Windsor and Maidenhead	0	2	2		
Wokingham	2	3	5		
Milton Keynes	3	0	3		
Brighton and Hove	0	0			
Portsmouth	0	0			
Southampton	0	0			
Isle of Wight	0	0			
Aylesbury Vale	0	0			
Chiltern	0	0			
South Bucks	0	0			
Wycombe	2	0	2		
Eastbourne	0	0			
Hastings	0	0			
Lewes	0	1	1		
Rother	0	0			
Wealden	1	1	2		
Basingstoke and Deane	4	1	5		
East Hampshire	1	2	3		
Eastleigh	0	0			
Fareham	0	0			
Gosport	0	1	1		
Hart	1	1	2		
Havant	0	0			
New Forest	0	0			
Rushmoor	1	2	3		
Test Valley	1	0	1		
Winchester	1	0	1		
Ashford	0	0			
Canterbury	1	0	1		
Dartford	0	0			
Dover	0	0			
Gravesham	0	0			
Maidstone	0	0			
Sevenoaks	0	0			
Shepway	0	0			
Swale	0	0			
Thanet	0	0			
Tonbridge and Malling	1	0	1		
Tunbridge Wells	0	0			
Cherwell	1	1	2		
Oxford	0	0			
South Oxfordshire	0	2	2		
Vale of White Horse	1	4	5		
West Oxfordshire	1	1	2		
Elmbridge	0	1	1		
Epsom and Ewell	0	0			
Guildford	0	0			
Mole Valley	0	0			
Reigate and Banstead	4	0	4		
Runnymede	1	2	3		
Spelthorne	3	0	3		

Surrey Heath	1	0	1	I	I
Tandridge	0	0		I	I
Waverley	0	1	1	I	I
Woking	2	0	2	I	I
Adur	0	0		I	I
Arun	0	0		I	I
Chichester	1	0	1	I	I
Crawley	2	3	5	I	I
Horsham	1	0	1	I	I
Mid Sussex	1	0	1	I	I
Worthing	0	0		I	I
Bath and North East Somerset	75	88	163	B	B
Bristol, City of	1,062	1,113			
E02003012 : Bristol 001	10	13	23	H	H
E02003013 : Bristol 002	19	16	35	F	F
E02003014 : Bristol 003	54	54	108	H	H
E02003015 : Bristol 004	75	103	178	F	F
E02003016 : Bristol 005	8	5	13	F	F
E02003017 : Bristol 006	33	35	68	H	H
E02003018 : Bristol 007	3	3	6	H	H
E02003019 : Bristol 008	68	73	141	H	H
E02003020 : Bristol 009	15	7	22	H	H
E02003021 : Bristol 010	5	13	18	F	F
E02003022 : Bristol 011	7	8	15	F	F
E02003023 : Bristol 012	6	3	9	I	I
E02003024 : Bristol 013	27	32	59	I	I
E02003025 : Bristol 014	28	23	51	F	F
E02003026 : Bristol 015	29	25	54	H	H
E02003027 : Bristol 016	19	23	42	F	F
E02003028 : Bristol 017	16	16	32	F	F
E02003029 : Bristol 018	5	2	7	I	I
E02003030 : Bristol 019	5	8	13	I	I
E02003031 : Bristol 020	15	12	27	F	F
E02003032 : Bristol 021	17	12	29	I	I
E02003033 : Bristol 022	13	17	30	F	F
E02003034 : Bristol 023	28	28	56	I	I
E02003036 : Bristol 025	35	28	63	I	I
E02003037 : Bristol 026	28	20	48	H	H
E02003038 : Bristol 027	4	1	5	I	I
E02003039 : Bristol 028	4	2	6	I	I
E02003040 : Bristol 029	7	12	19	I	I
E02003041 : Bristol 030	15	14	29	H	H
E02003043 : Bristol 032	168	196	364	B	B
E02003044 : Bristol 033	4	2	6	B	B
E02003045 : Bristol 034	2	3	5	B	B
E02003046 : Bristol 035	9	16	25	B	B
E02003047 : Bristol 036	11	12	23	B	B
E02003048 : Bristol 037	1	1	2	B	B
E02003049 : Bristol 038	8	7	15	B	B
E02003050 : Bristol 039	21	15	36	B	B
E02003051 : Bristol 040	1	3	4	B	B
E02003052 : Bristol 041	14	17	31	B	B
E02003053 : Bristol 042	6	4	10	B	B
E02003054 : Bristol 043	16	11	27	B	B
E02003055 : Bristol 044	2	0	2	B	B
E02003056 : Bristol 045	7	3	10	B	B

E02003057 : Bristol 046	3	9	12	I	I	
E02003058 : Bristol 047	4	5	9	B	B	
E02003059 : Bristol 048	4	6	10	I	I	
E02003060 : Bristol 049	2	3	5	B	B	
E02003061 : Bristol 050	0	1	1	I	I	
E02003062 : Bristol 051	1	0	1	I	I	
E02003063 : Bristol 052	4	2	6	I	I	
E02003064 : Bristol 053	19	10	29	B	B	
E02006887 : Bristol 054	102	131	233	I	I	
E02006888 : Bristol 055	14	10	24	B	B	
E02006889 : Bristol 056	40	34	74	B	B	
E02006890 : Bristol 057	1	4	5	I	I	
Cornwall,Isles of Scilly	2	0	2	H	H	
Wiltshire	47	41	88	H	H	
North Somerset	154	138	292	H	H	
South Gloucestershire	2,121	2,110				0
E02003090 : South Gloucestershire 001	50	46	96	B	J	
E02003091 : South Gloucestershire 002	79	65	144	B	J	
E02003092 : South Gloucestershire 003	51	39	90	B	A	
E02003093 : South Gloucestershire 004	60	34	94	B	B	
E02003094 : South Gloucestershire 005	225	264	489	H	H	
E02003095 : South Gloucestershire 006	26	28	54	B	A	
E02003096 : South Gloucestershire 007	6	9	15	B	A	
E02003097 : South Gloucestershire 008	28	17	45	B	A	
E02003098 : South Gloucestershire 009	334	294	628	K	K	
E02003099 : South Gloucestershire 010	9	8	17	B	A	
E02003100 : South Gloucestershire 011	323	329	652	G	G	
E02003101 : South Gloucestershire 012	88	130	218	E	E	
E02003102 : South Gloucestershire 013	18	11	29	B	A	
E02003103 : South Gloucestershire 014	3	1	4	B	A	
E02003104 : South Gloucestershire 015	18	34	52	E	E	
E02003105 : South Gloucestershire 016	31	25	56	B	B	
E02003106 : South Gloucestershire 017	457	440	897	I	I	
E02003107 : South Gloucestershire 018	112	142	254	F	F	
E02003108 : South Gloucestershire 019	62	65	127	B	B	
E02003109 : South Gloucestershire 020	5	2	7	I	I	
E02003110 : South Gloucestershire 021	29	28	57	I	I	
E02003111 : South Gloucestershire 022	15	7	22	I	I	
E02003112 : South Gloucestershire 023	2	2	4	I	I	
E02003113 : South Gloucestershire 024	15	11	26	I	I	
E02003114 : South Gloucestershire 025	18	16	34	I	I	
E02003115 : South Gloucestershire 026	6	13	19	I	I	
E02003116 : South Gloucestershire 027	5	5	10	I	I	
E02003117 : South Gloucestershire 028	11	10	21	I	I	
E02003118 : South Gloucestershire 029	14	11	25	I	I	
E02003119 : South Gloucestershire 030	3	6	9	I	I	
E02003120 : South Gloucestershire 031	11	11	22	I	I	
E02003121 : South Gloucestershire 032	7	7	14	I	I	
Plymouth	0	2	2	H	H	
Torbay	0	0				
Bournemouth	0	0				
Poole	0	0				
Swindon	26	38	64	I	I	
East Devon	1	1	2	H	H	
Exeter	1	1	2	H	H	
Mid Devon	2	1	3	H	H	

North Devon	0	0		
South Hams	0	0		
Teignbridge	0	0		
Torridge	1	0	1 H	H
West Devon	0	0		
Christchurch	0	0		
East Dorset	0	0		
North Dorset	0	0		
Purbeck	1	2	3 H	H
West Dorset	1	0	1 H	H
Weymouth and Portland	0	0		
Cheltenham	14	22	36 I	I
Cotswold	5	10	15 I	I
Forest of Dean	7	5	12 I	I
Gloucester	41	25	66 I	I
Stroud	54	35	89 I	I
Tewkesbury	29	42	71 I	I
Mendip	5	2	7 H	H
Sedgemoor	14	7	21 H	H
South Somerset	4	4	8 H	H
Taunton Deane	5	9	14 H	H
West Somerset	0	0		
Isle of Anglesey	0	1	1 I	I
Gwynedd	0	1	1 I	I
Conwy	0	0		
Denbighshire	0	0		
Flintshire	1	0	1 I	I
Wrexham	0	0		
Ceredigion	0	0		
Pembrokeshire	0	0		
Carmarthenshire	0	0		
Swansea	2	0	2 I	I
Neath Port Talbot	0	0		
Bridgend	1	0	1 I	I
The Vale of Glamorgan	0	2	2 I	I
Cardiff	18	12	30 I	I
Rhondda Cynon Taf	4	1	5 I	I
Caerphilly	1	1	2 I	I
Blaenau Gwent	0	0	I	I
Torfaen	3	1	4 I	I
Monmouthshire	9	11	20 I	I
Newport	18	5	23 I	I
Powys	1	0	1 I	I
Merthyr Tydfil	0	3	3 I	I
			7,830	




Cribbs Causeway
Charlton Hayes
Catbrain
Coalpit Heath
Winterbourne
Stoke Gifford
Winterbourne Down
Westerleigh
Brentry
Filton
Henbury
Southmead
A4174 Filton, Downend
Lyde Green
M4
Westbury on Trym
Stoke Park
Frenchay
Blackhorse
Emerson's Green
Lockleaze
Downend
Pucklechurch
Henleaze
Stapleton
Stoke Bishop
Bishopston
Westbury Park
A4174
Siston

WU03EW - Location of usual residence and place of work by method of travel to work (MSOA level)

ONS Crown Copyright Reserved [from Nomis on 13 June 2017]

population	All usual residents aged 16 and over in employment the week before the census
units	Persons
date	2011
method of travel to work	Driving a car or van

place of work	usual residence: E02003090 : South Gloucestershire 001	usual residence: E02003091 : South Gloucestershire 002		
E02003090 : South Gloucestershire 001	210	206	416	A
E02003091 : South Gloucestershire 002	239	264	503	A
E02003092 : South Gloucestershire 003	47	50	97	A
E02003093 : South Gloucestershire 004	136	114	250	A
E02003094 : South Gloucestershire 005	90	97	187	C
E02003095 : South Gloucestershire 006	17	26	43	A
E02003096 : South Gloucestershire 007	1	6	7	A
E02003097 : South Gloucestershire 008	10	16	26	A
E02003098 : South Gloucestershire 009	55	41	96	D
E02003099 : South Gloucestershire 010	5	2	7	A
E02003100 : South Gloucestershire 011	74	55	129	F
E02003101 : South Gloucestershire 012	13	12	25	D
E02003102 : South Gloucestershire 013	4	5	9	A
E02003103 : South Gloucestershire 014	3	1	4	A
E02003104 : South Gloucestershire 015	3	1	4	D
E02003105 : South Gloucestershire 016	5	8	13	B
E02003106 : South Gloucestershire 017	105	118	223	E
E02003107 : South Gloucestershire 018	31	39	70	E
E02003108 : South Gloucestershire 019	44	32	76	B
E02003109 : South Gloucestershire 020	1	2	3	B
E02003110 : South Gloucestershire 021	11	9	20	B
E02003111 : South Gloucestershire 022	2	4	6	B
E02003112 : South Gloucestershire 023	3	0	3	B
E02003113 : South Gloucestershire 024	8	7	15	A
E02003114 : South Gloucestershire 025	10	4	14	B
E02003115 : South Gloucestershire 026	5	8	13	B
E02003116 : South Gloucestershire 027	2	2	4	B
E02003117 : South Gloucestershire 028	5	6	11	B
E02003118 : South Gloucestershire 029	5	6	11	B
E02003119 : South Gloucestershire 030	0	1	1	B
E02003120 : South Gloucestershire 031	3	1	4	B
E02003121 : South Gloucestershire 032	1	1	2	B
Hartlepool	0	0	0	A
Middlesbrough	0	0	0	A
Redcar and Cleveland	0	0	0	A
Stockton-on-Tees	0	0	0	A
Darlington	0	0	0	A
County Durham	0	0	0	A
Northumberland	1	0	1	A
Gateshead	0	0	0	A
Newcastle upon Tyne	0	0	0	A
North Tyneside	0	0	0	A
South Tyneside	0	0	0	A
Sunderland	0	0	0	A
Halton	0	0	0	A
Warrington	2	1	3	A
Blackburn with Darwen	0	0	0	A
Blackpool	0	0	0	A
Cheshire East	0	0	0	A
Cheshire West and Chester	0	0	0	A
Allerdale	0	0	0	A
Barrow-in-Furness	0	0	0	A
Carlisle	0	0	0	A
Copeland	0	1	1	A
Eden	0	0	0	A
South Lakeland	0	0	0	A
Burnley	0	0	0	A
Chorley	0	0	0	A
Fylde	0	0	0	A
Hyndburn	0	0	0	A
Lancaster	0	0	0	A
Pendle	0	0	0	A
Preston	1	1	2	A
Ribble Valley	1	0	1	A
Rossendale	0	0	0	A
South Ribble	0	0	0	A
West Lancashire	0	0	0	A
Wyre	0	0	0	A
Bolton	0	0	0	A
Bury	0	0	0	A
Manchester	7	9	16	A
Oldham	0	0	0	A
Rochdale	0	0	0	A
Salford	1	0	1	A
Stockport	1	0	1	A
Tameside	0	0	0	A
Trafford	0	0	0	A
Wigan	1	0	1	A

A	1839	46%
B	898	23%
C	513	13%
D	125	3%
E	485	12%
F	129	3%
	3989	100%

3,989





Knowsley	2	0	2 A
Liverpool	0	0	0 A
St. Helens	0	0	0 A
Sefton	0	0	0 A
Wirral	2	0	2 A
Kingston upon Hull, City of	0	0	0 A
East Riding of Yorkshire	0	0	0 A
North East Lincolnshire	0	0	0 A
North Lincolnshire	0	0	0 A
York	2	0	2 A
Craven	0	0	0 A
Hambleton	0	0	0 A
Harrogate	0	0	0 A
Richmondshire	0	0	0 A
Ryedale	0	0	0 A
Scarborough	0	0	0 A
Selby	0	0	0 A
Barnsley	0	0	0 A
Doncaster	0	0	0 A
Rotherham	0	0	0 A
Sheffield	0	0	0 A
Bradford	0	0	0 A
Calderdale	1	1	2 A
Kirklees	0	0	0 A
Leeds	0	0	0 A
Wakefield	0	0	0 A
Derby	0	0	0 A
Leicester	0	3	3 A
Rutland	0	0	0 A
Nottingham	0	0	0 A
Amber Valley	0	0	0 A
Bolsover	0	0	0 A
Chesterfield	0	0	0 A
Derbyshire Dales	0	0	0 A
Erewash	0	0	0 A
High Peak	0	0	0 A
North East Derbyshire	0	0	0 A
South Derbyshire	0	1	1 A
Blaby	0	0	0 A
Charnwood	0	0	0 A
Harborough	0	0	0 A
Hinckley and Bosworth	0	0	0 A
Melton	0	0	0 A
North West Leicestershire	0	1	1 A
Oadby and Wigston	0	0	0 A
Boston	0	0	0 A
East Lindsey	0	0	0 A
Lincoln	0	0	0 A
North Kesteven	0	0	0 A
South Holland	0	0	0 A
South Kesteven	0	1	1 A
West Lindsey	0	0	0 A
Corby	0	0	0 A
Daventry	0	0	0 A
East Northamptonshire	0	0	0 A
Kettering	0	1	1 A
Northampton	1	0	1 A
South Northamptonshire	1	8	9 A
Wellingborough	0	0	0 A
Ashfield	0	0	0 A
Bassetlaw	0	0	0 A
Broxtowe	0	0	0 A
Gedling	0	0	0 A
Mansfield	0	0	0 A
Newark and Sherwood	0	0	0 A
Rushcliffe	0	0	0 A
Herefordshire, County of	1	3	4 A
Telford and Wrekin	0	0	0 A
Stoke-on-Trent	0	0	0 A
Shropshire	1	0	1 A
Cannock Chase	0	0	0 A
East Staffordshire	1	0	1 A
Lichfield	0	0	0 A
Newcastle-under-Lyme	0	0	0 A
South Staffordshire	0	0	0 A
Stafford	0	0	0 A
Staffordshire Moorlands	0	0	0 A
Tamworth	0	0	0 A
North Warwickshire	1	0	1 A
Nuneaton and Bedworth	0	0	0 A
Rugby	8	6	14 A
Stratford-on-Avon	1	0	1 A
Warwick	1	0	1 A
Bromsgrove	0	0	0 A
Malvern Hills	0	0	0 A
Redditch	0	1	1 A
Worcester	1	2	3 A
Wychavon	0	0	0 A
Wyre Forest	0	0	0 A
Birmingham	1	3	4 A

Coventry	1	0	1 A
Dudley	1	0	1 A
Sandwell	2	1	3 A
Solihull	0	0	0 A
Walsall	0	0	0 A
Wolverhampton	2	0	2 A
Peterborough	0	0	0 A
Luton	0	2	2 A
Southend-on-Sea	0	0	0 A
Thurrock	0	0	0 A
Bedford	0	0	0 B
Central Bedfordshire	0	1	1 B
Cambridge	0	0	0 B
East Cambridgeshire	0	0	0 B
Fenland	0	0	0 B
Huntingdonshire	0	0	0 B
South Cambridgeshire	1	0	1 B
Basildon	0	1	1 B
Braintree	0	0	0 B
Brentwood	1	0	1 B
Castle Point	0	0	0 B
Chelmsford	0	0	0 B
Colchester	0	0	0 B
Epping Forest	0	0	0 B
Harlow	0	0	0 B
Maldon	0	0	0 B
Rochford	0	0	0 B
Tendring	0	0	0 B
Uttlesford	0	0	0 B
Broxbourne	1	0	1 B
Dacorum	0	1	1 B
East Hertfordshire	1	0	1 B
Hertsmere	1	0	1 B
North Hertfordshire	0	0	0 B
St Albans	0	1	1 B
Stevenage	0	1	1 B
Three Rivers	0	0	0 B
Watford	0	0	0 B
Welwyn Hatfield	0	1	1 B
Breckland	0	0	0 B
Broadland	0	0	0 B
Great Yarmouth	0	0	0 B
King's Lynn and West Norfolk	0	0	0 B
North Norfolk	0	0	0 B
Norwich	0	0	0 B
South Norfolk	0	0	0 B
Babergh	0	0	0 B
Forest Heath	0	0	0 B
Ipswich	0	0	0 B
Mid Suffolk	0	0	0 B
St Edmundsbury	0	0	0 B
Suffolk Coastal	0	0	0 B
Waveney	1	0	1 B
Barking and Dagenham	0	0	0 B
Barnet	1	0	1 B
Bexley	0	0	0 B
Brent	0	1	1 B
Bromley	0	0	0 B
Camden	0	1	1 B
Croydon	2	1	3 B
Ealing	0	0	0 B
Enfield	0	0	0 B
Greenwich	0	0	0 B
Hackney	0	0	0 B
Hammersmith and Fulham	0	0	0 B
Haringey	0	0	0 B
Harrow	0	0	0 B
Havering	0	0	0 B
Hillingdon	0	0	0 B
Hounslow	2	0	2 B
Islington	0	0	0 B
Kensington and Chelsea	0	0	0 B
Kingston upon Thames	0	1	1 B
Lambeth	1	0	1 B
Lewisham	0	0	0 B
Merton	0	0	0 B
Newham	0	0	0 B
Redbridge	0	0	0 B
Richmond upon Thames	1	0	1 B
Southwark	2	0	2 B
Sutton	0	0	0 B
Tower Hamlets	0	0	0 B
Waltham Forest	0	0	0 B
Wandsworth	0	0	0 B
Westminster,City of London	6	5	11 B
Medway	0	0	0 B
Bracknell Forest	1	1	2 B
West Berkshire	2	1	3 B
Reading	0	0	0 B
Slough	1	0	1 B

Windsor and Maidenhead	1	0	1	B
Wokingham	0	0	0	B
Milton Keynes	0	0	0	B
Brighton and Hove	0	0	0	B
Portsmouth	0	1	1	B
Southampton	0	1	1	B
Isle of Wight	0	0	0	B
Aylesbury Vale	0	1	1	B
Chiltern	0	0	0	B
South Bucks	0	0	0	B
Wycombe	1	0	1	B
Eastbourne	0	0	0	B
Hastings	0	0	0	B
Lewes	0	0	0	B
Rother	0	0	0	B
Wealden	0	0	0	B
Basingstoke and Deane	0	0	0	B
East Hampshire	0	0	0	B
Eastleigh	0	0	0	B
Fareham	0	0	0	B
Gosport	0	0	0	B
Hart	2	2	4	B
Havant	0	0	0	B
New Forest	0	0	0	B
Rushmoor	0	1	1	B
Test Valley	0	1	1	B
Winchester	0	0	0	B
Ashford	0	0	0	B
Canterbury	0	0	0	B
Dartford	0	1	1	B
Dover	0	0	0	B
Gravesham	0	0	0	B
Maidstone	0	0	0	B
Sevenoaks	0	0	0	B
Shepway	0	0	0	B
Swale	0	0	0	B
Thanet	0	0	0	B
Tonbridge and Malling	0	0	0	B
Tunbridge Wells	0	0	0	B
Cherwell	0	0	0	B
Oxford	1	0	1	B
South Oxfordshire	0	0	0	B
Vale of White Horse	1	2	3	B
West Oxfordshire	1	0	1	B
Elmbridge	0	0	0	B
Epsom and Ewell	0	0	0	B
Guildford	0	1	1	B
Mole Valley	0	0	0	B
Reigate and Banstead	0	0	0	B
Runnymede	0	1	1	B
Spelthorne	0	0	0	B
Surrey Heath	1	0	1	B
Tandridge	0	0	0	B
Waverley	0	0	0	B
Woking	0	0	0	B
Adur	0	0	0	B
Arun	0	0	0	B
Chichester	0	0	0	B
Crawley	2	4	6	B
Horsham	0	0	0	B
Mid Sussex	0	0	0	B
Worthing	0	0	0	B
Bath and North East Somerset	35	23	58	B
Bristol, City of				
Cornwall,Isles of Scilly	1	0	1	C
Wiltshire	26	12	38	B
North Somerset	52	45	97	C
South Gloucestershire			0	
Plymouth	4	1	5	C
Torbay	0	1	1	C
Bournemouth	0	0	0	B
Poole	0	0	0	B
Swindon	11	8	19	B
East Devon	0	0	0	B
Exeter	3	0	3	B
Mid Devon	0	0	0	B
North Devon	0	0	0	B
South Hams	0	0	0	B
Teignbridge	0	0	0	B
Torridge	1	1	2	B
West Devon	0	0	0	B
Christchurch	0	0	0	B
East Dorset	0	0	0	B
North Dorset	0	0	0	B
Purbeck	0	0	0	B
West Dorset	0	2	2	B
Weymouth and Portland	0	0	0	B
Cheltenham	8	18	26	A
Cotswold	7	8	15	A
Forest of Dean	6	4	10	B

Gloucester	39	39	78	A
Stroud	124	88	212	A
Tewkesbury	24	15	39	A
Mendip	1	1	2	B
Sedgemoor	3	5	8	B
South Somerset	1	0	1	B
Taunton Deane	1	0	1	B
West Somerset	1	0	1	B
Isle of Anglesey	0	0	0	B
Gwynedd	0	0	0	B
Conwy	0	0	0	B
Denbighshire	0	0	0	B
Flintshire	0	0	0	B
Wrexham	0	0	0	B
Ceredigion	0	0	0	B
Pembrokeshire	0	0	0	B
Carmarthenshire	0	0	0	B
Swansea	0	1	1	B
Neath Port Talbot	1	1	2	B
Bridgend	0	0	0	B
The Vale of Glamorgan	1	1	2	B
Cardiff	9	8	17	B
Rhondda Cynon Taf	0	1	1	B
Caerphilly	0	2	2	B
Blaenau Gwent	0	0	0	B
Torfaen	3	0	3	B
Monmouthshire	2	4	6	B
Newport	7	8	15	B
Powys	0	0	0	B
Merthyr Tydfil	0	1	1	B
E02003012 : Bristol 001	3	6	9	C
E02003013 : Bristol 002	4	5	9	E
E02003014 : Bristol 003	26	34	60	C
E02003015 : Bristol 004	39	39	78	E
E02003016 : Bristol 005	5	4	9	E
E02003017 : Bristol 006	13	12	25	E
E02003018 : Bristol 007	1	0	1	C
E02003019 : Bristol 008	32	54	86	C
E02003020 : Bristol 009	2	2	4	E
E02003021 : Bristol 010	1	1	2	E
E02003022 : Bristol 011	1	2	3	E
E02003023 : Bristol 012	3	2	5	B
E02003024 : Bristol 013	8	7	15	B
E02003025 : Bristol 014	14	7	21	B
E02003026 : Bristol 015	5	1	6	C
E02003027 : Bristol 016	5	7	12	E
E02003028 : Bristol 017	6	5	11	E
E02003029 : Bristol 018	0	0	0	B
E02003030 : Bristol 019	4	2	6	B
E02003031 : Bristol 020	1	1	2	E
E02003032 : Bristol 021	5	4	9	B
E02003033 : Bristol 022	6	8	14	E
E02003034 : Bristol 023	7	7	14	B
E02003036 : Bristol 025	12	11	23	E
E02003037 : Bristol 026	8	11	19	C
E02003038 : Bristol 027	1	0	1	B
E02003039 : Bristol 028	1	1	2	B
E02003040 : Bristol 029	0	3	3	B
E02003041 : Bristol 030	6	10	16	C
E02003043 : Bristol 032	97	71	168	B
E02003044 : Bristol 033	1	1	2	B
E02003045 : Bristol 034	2	2	4	C
E02003046 : Bristol 035	9	3	12	B
E02003047 : Bristol 036	3	5	8	C
E02003048 : Bristol 037	0	0	0	B
E02003049 : Bristol 038	2	5	7	B
E02003050 : Bristol 039	10	8	18	B
E02003051 : Bristol 040	0	0	0	B
E02003052 : Bristol 041	5	6	11	C
E02003053 : Bristol 042	2	1	3	B
E02003054 : Bristol 043	7	6	13	B
E02003055 : Bristol 044	1	0	1	B
E02003056 : Bristol 045	1	1	2	B
E02003057 : Bristol 046	0	2	2	C
E02003058 : Bristol 047	2	1	3	B
E02003059 : Bristol 048	0	4	4	B
E02003060 : Bristol 049	0	0	0	B
E02003061 : Bristol 050	0	0	0	C
E02003062 : Bristol 051	1	0	1	B
E02003063 : Bristol 052	2	0	2	B
E02003064 : Bristol 053	6	4	10	B
E02006887 : Bristol 054	54	48	102	B
E02006888 : Bristol 055	6	2	8	B
E02006889 : Bristol 056	2	14	16	B
E02006890 : Bristol 057	5	1	6	B

APPENDIX E: ARCADY OUTPUTS

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.0.1.4646 []
©Copyright TRL Limited, 2017

For sales and distribution information, program advice and maintenance, contact TRL:
Tel: +44(0)1344 770758 email: software@trl.co.uk Web: http://www.trlsoftware.co.uk

The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution

Filename: Southern Access junction.j9
Path: P:\Projects\160000\162451 - Woodland Golf Course\3. Design and Calcs\3. ARCADY\Capacity Tests
Report generation date: 02/08/2017 10:08:53

»2017 + Dev, AM
»2017 + Dev, PM
»2036 + Dev, AM
»2036 + Dev, PM

Summary of junction performance

	AM			PM		
4	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2017 + Dev					
Arm 1	0.5	3.75	0.35	0.5	4.39	0.34
Arm 2	1.6	7.94	0.62	0.4	4.01	0.28
Arm 3	0.4	3.01	0.26	2.1	7.00	0.67
	2036 + Dev					
Arm 1	0.5	3.83	0.35	0.5	4.68	0.35
Arm 2	2.3	10.18	0.71	0.4	4.16	0.30
Arm 3	0.4	3.08	0.28	2.6	8.32	0.73

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.

File summary

File Description

Title	(untitled)
Location	4
Site number	4
Date	03/07/2017
Version	4
Status	(new file)
Identifier	4
Client	4
Jobnumber	4
Enumerator	VECTOS\BristolTransport
Description	4

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75	4	4	4	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically	Relationship type	Relationship
D1	2017	AM	ONE HOUR	07:45	09:15	15	4	4	4
D2	2017	PM	ONE HOUR	16:45	18:15	15	4	4	4
D3	Dev	AM	ONE HOUR	07:45	09:15	15	4	4	4
D4	Dev	PM	ONE HOUR	16:45	18:15	15	4	4	4
D5	2017 + Dev	AM	ONE HOUR	07:45	09:15	15	✓	Simple	D1+D3
D6	2017 + Dev	PM	ONE HOUR	16:45	18:15	15	✓	Simple	D2+D4
D7	2023	AM	ONE HOUR	07:45	09:15	15	4	Simple	D1*1.0701
D8	2023	PM	ONE HOUR	16:45	18:15	15	4	Simple	D2*1.0675
D9	2023 + Dev	AM	ONE HOUR	07:45	09:15	15	4	Simple	D7+D3
D10	2023 + Dev	PM	ONE HOUR	16:45	18:15	15	4	Simple	D8+D4
D11	2036	AM	ONE HOUR	07:45	09:15	15	4	Simple	D1*1.1463
D12	2036	PM	ONE HOUR	16:45	18:15	15	4	Simple	D2*1.1452
D13	2036 + Dev	AM	ONE HOUR	07:45	09:15	15	✓	Simple	D11+D3
D14	2036 + Dev	PM	ONE HOUR	16:45	18:15	15	✓	Simple	D12+D4

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

2017 + Dev, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Demand Set Relationship	D9 - 2023 + Dev, AM	Demand Set relationships are chained. This may slow down the file.
Warning	Vehicle Mix	4	HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1,2,3	5.42	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	Woodlands	4
2	Trench Lane (East)	4
3	Trench Lane West	4

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1	3.65	7.06	9.5	30.0	36.0	35.0	4
2	3.65	6.39	6.9	20.0	36.0	37.0	4
3	3.65	7.00	13.0	25.0	36.0	33.0	4

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.627	1586
2	0.589	1437
3	0.642	1661

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically	Relationship type	Relationship
D5	2017 + Dev	AM	ONE HOUR	07:45	09:15	15	✓	Simple	D1+D3

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1	4	ONE HOUR	✓	461	100.000
2	4	ONE HOUR	✓	676	100.000
3	4	ONE HOUR	✓	388	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		1	2	3
From	1	0	92	369
	2	54	0	622
	3	214	174	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		1	2	3
From	1	0	0	0
	2	0	0	0
	3	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.35	3.75	0.5	A	423	635
2	0.62	7.94	1.6	A	620	930
3	0.26	3.01	0.4	A	356	534

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	347	87	131	1504	0.231	346	201	0.0	0.3	3.105	A
2	509	127	277	1274	0.400	506	200	0.0	0.7	4.676	A
3	292	73	40	1635	0.179	291	743	0.0	0.2	2.677	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	414	104	156	1488	0.279	414	241	0.3	0.4	3.352	A
2	608	152	331	1241	0.490	607	239	0.7	0.9	5.660	A
3	349	87	48	1630	0.214	349	890	0.2	0.3	2.809	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	508	127	191	1466	0.346	507	295	0.4	0.5	3.752	A
2	744	186	406	1198	0.622	742	293	0.9	1.6	7.850	A
3	427	107	59	1623	0.263	427	1088	0.3	0.4	3.009	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	508	127	192	1466	0.346	508	295	0.5	0.5	3.755	A
2	744	186	406	1197	0.622	744	293	1.6	1.6	7.942	A
3	427	107	59	1623	0.263	427	1091	0.4	0.4	3.009	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	414	104	157	1488	0.279	415	241	0.5	0.4	3.356	A
2	608	152	332	1241	0.490	610	239	1.6	1.0	5.731	A
3	349	87	49	1630	0.214	349	894	0.4	0.3	2.813	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	347	87	131	1504	0.231	347	202	0.4	0.3	3.115	A
2	509	127	278	1273	0.400	510	200	1.0	0.7	4.727	A
3	292	73	41	1635	0.179	292	747	0.3	0.2	2.681	A

2017 + Dev, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Demand Set Relationship	D9 - 2023 + Dev, AM	Demand Set relationships are chained. This may slow down the file.
Warning	Vehicle Mix	4	HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1,2,3	5.85	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically	Relationship type	Relationship
D6	2017 + Dev	PM	ONE HOUR	16:45	18:15	15	✓	Simple	D2+D4

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1	4	ONE HOUR	✓	376	100.000
2	4	ONE HOUR	✓	313	100.000
3	4	ONE HOUR	✓	969	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		1	2	3
From	1	0	75	301
	2	114	0	199
	3	458	511	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		1	2	3
From	1	0	0	0
	2	0	0	0
	3	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.34	4.39	0.5	A	345	518
2	0.28	4.01	0.4	A	287	431
3	0.67	7.00	2.1	A	889	1334

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	283	71	383	1346	0.210	282	429	0.0	0.3	3.380	A
2	236	59	226	1304	0.181	235	439	0.0	0.2	3.364	A
3	730	182	86	1606	0.454	726	375	0.0	0.8	4.076	A

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	338	85	459	1299	0.260	338	513	0.3	0.3	3.746	A
2	281	70	270	1277	0.220	281	526	0.2	0.3	3.613	A
3	871	218	102	1595	0.546	870	449	0.8	1.2	4.949	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	414	103	561	1235	0.335	413	628	0.3	0.5	4.381	A
2	345	86	331	1242	0.278	344	643	0.3	0.4	4.009	A
3	1067	267	125	1581	0.675	1064	550	1.2	2.0	6.914	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	414	103	563	1233	0.336	414	630	0.5	0.5	4.392	A
2	345	86	331	1241	0.278	345	645	0.4	0.4	4.014	A
3	1067	267	126	1581	0.675	1067	550	2.0	2.1	7.003	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	338	85	461	1297	0.261	339	516	0.5	0.4	3.760	A
2	281	70	271	1277	0.220	282	529	0.4	0.3	3.617	A
3	871	218	103	1595	0.546	874	450	2.1	1.2	5.016	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	283	71	386	1344	0.211	283	431	0.4	0.3	3.393	A
2	236	59	227	1303	0.181	236	442	0.3	0.2	3.373	A
3	730	182	86	1606	0.454	731	377	1.2	0.8	4.120	A

2036 + Dev, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Demand Set Relationship	D9 - 2023 + Dev, AM	Demand Set relationships are chained. This may slow down the file.
Warning	Vehicle Mix	4	HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1,2,3	6.61	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically	Relationship type	Relationship
D13	2036 + Dev	AM	ONE HOUR	07:45	09:15	15	✓	Simple	D11+D3

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1	4	ONE HOUR	✓	461	100.000
2	4	ONE HOUR	✓	767	100.000
3	4	ONE HOUR	✓	413	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		1	2	3
From	1	0	92	369
	2	54	0	713
	3	214	199	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		1	2	3
From	1	0	0	0
	2	0	0	0
	3	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.35	3.83	0.5	A	423	635
2	0.71	10.18	2.3	B	704	1056
3	0.28	3.08	0.4	A	379	569

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	347	87	150	1492	0.233	346	201	0.0	0.3	3.138	A
2	577	144	277	1274	0.453	574	219	0.0	0.8	5.124	A
3	311	78	40	1635	0.190	310	811	0.0	0.2	2.716	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	414	104	179	1474	0.281	414	241	0.3	0.4	3.397	A
2	690	172	331	1241	0.555	688	262	0.8	1.2	6.484	A
3	372	93	48	1630	0.228	371	971	0.2	0.3	2.860	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	508	127	219	1448	0.350	507	295	0.4	0.5	3.822	A
2	844	211	406	1198	0.705	840	321	1.2	2.3	9.952	A
3	455	114	59	1623	0.280	455	1187	0.3	0.4	3.081	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	508	127	220	1448	0.350	508	295	0.5	0.5	3.825	A
2	844	211	406	1197	0.705	844	321	2.3	2.3	10.185	B
3	455	114	59	1623	0.280	455	1191	0.4	0.4	3.081	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	414	104	179	1474	0.281	415	241	0.5	0.4	3.404	A
2	690	172	332	1241	0.556	694	262	2.3	1.3	6.629	A
3	372	93	49	1630	0.228	372	977	0.4	0.3	2.862	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	347	87	150	1492	0.233	347	202	0.4	0.3	3.146	A
2	577	144	278	1273	0.454	579	220	1.3	0.8	5.202	A
3	311	78	41	1635	0.190	312	816	0.3	0.2	2.722	A

2036 + Dev, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Demand Set Relationship	D9 - 2023 + Dev, AM	Demand Set relationships are chained. This may slow down the file.
Warning	Vehicle Mix	4	HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1,2,3	6.74	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically	Relationship type	Relationship
D14	2036 + Dev	PM	ONE HOUR	16:45	18:15	15	✓	Simple	D12+D4

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1	4	ONE HOUR	✓	376	100.000
2	4	ONE HOUR	✓	342	100.000
3	4	ONE HOUR	✓	1043	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		1	2	3
From	1	0	75	301
	2	114	0	228
	3	458	585	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		1	2	3
From	1	0	0	0
	2	0	0	0
	3	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.35	4.68	0.5	A	345	518
2	0.30	4.16	0.4	A	314	471
3	0.73	8.32	2.6	A	957	1436

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	283	71	438	1311	0.216	282	429	0.0	0.3	3.494	A
2	257	64	226	1304	0.197	256	495	0.0	0.2	3.434	A
3	785	196	85	1606	0.489	782	397	0.0	0.9	4.345	A

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	338	85	525	1257	0.269	338	513	0.3	0.4	3.914	A
2	307	77	270	1277	0.241	307	592	0.2	0.3	3.710	A
3	938	234	102	1595	0.588	936	475	0.9	1.4	5.443	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	414	103	642	1184	0.350	413	628	0.4	0.5	4.668	A
2	376	94	331	1242	0.303	376	724	0.3	0.4	4.156	A
3	1149	287	125	1581	0.727	1144	581	1.4	2.6	8.154	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	414	103	644	1182	0.350	414	630	0.5	0.5	4.684	A
2	376	94	331	1241	0.303	376	727	0.4	0.4	4.161	A
3	1149	287	126	1581	0.727	1148	582	2.6	2.6	8.320	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	338	85	529	1255	0.269	339	516	0.5	0.4	3.934	A
2	307	77	271	1277	0.241	308	596	0.4	0.3	3.718	A
3	938	234	103	1595	0.588	942	476	2.6	1.4	5.552	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	283	71	442	1309	0.216	283	432	0.4	0.3	3.512	A
2	257	64	227	1303	0.198	258	498	0.3	0.2	3.444	A
3	785	196	86	1606	0.489	787	399	1.4	1.0	4.406	A

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.0.1.4646 []
©Copyright TRL Limited, 2017

For sales and distribution information, program advice and maintenance, contact TRL:
Tel: +44(0)1344 770758 email: software@trl.co.uk Web: http://www.trlsoftware.co.uk

The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution

Filename: Northern Access junction V2.j9
Path: P:\Projects\160000\162451 - Woodland Golf Course\3. Design and Calcs\3. ARCADY\Capacity Tests
Report generation date: 02/08/2017 10:08:01

»2017 + Dev, AM
»2017 + Dev, PM
»2036 + Dev, AM
»2036 + Dev, PM

Summary of junction performance

	AM			PM		
4	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2017 + Dev					
Arm 1	0.1	3.01	0.10	0.1	3.05	0.06
Arm 2	0.5	4.92	0.35	0.5	4.55	0.32
Arm 3	0.3	4.76	0.26	0.7	6.14	0.42
Arm 4	0.0	0.00	0.00	0.0	0.00	0.00
	2036 + Dev					
Arm 1	0.1	3.06	0.11	0.1	3.07	0.06
Arm 2	0.5	4.99	0.35	0.5	4.58	0.32
Arm 3	0.4	4.81	0.27	0.8	6.30	0.44
Arm 4	0.0	0.00	0.00	0.0	0.00	0.00

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.

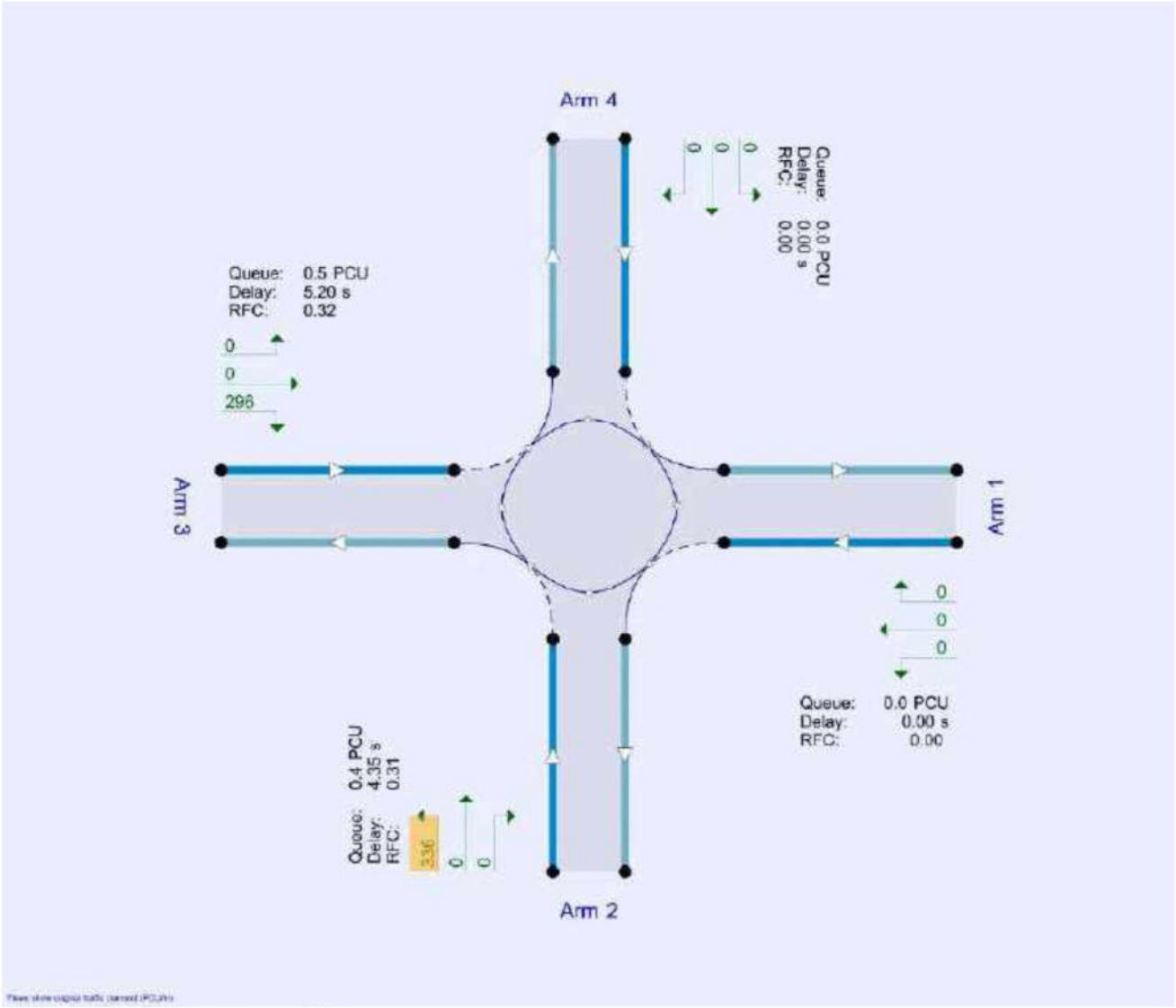
File summary

File Description

Title	(untitled)
Location	4
Site number	4
Date	12/07/2017
Version	4
Status	(new file)
Identifier	4
Client	4
Jobnumber	4
Enumerator	VECTOS\BristolTransport
Description	4

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin



The junction diagram reflects the last run of Junctions.

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75	4	4	4	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically	Relationship type	Relationship
D1	2017	AM	ONE HOUR	07:45	09:15	15	4	4	4
D2	2017	PM	ONE HOUR	16:45	18:15	15	4	4	4
D3	Dev	AM	ONE HOUR	07:45	09:15	15	4	4	4
D4	Dev	PM	ONE HOUR	16:45	18:15	15	4	4	4
D5	2023	AM	ONE HOUR	07:45	09:15	15	4	Simple	D1*1.0701
D6	2023	PM	ONE HOUR	16:45	18:15	15	4	Simple	D2*1.0675
D7	2036	AM	ONE HOUR	07:45	09:15	15	4	Simple	D1*1.1463
D8	2036	PM	ONE HOUR	16:45	18:15	15	4	Simple	D2*1.1452
D9	2017 + Dev	AM	ONE HOUR	07:45	09:15	15	✓	Simple	D3+D1
D10	2017 + Dev	PM	ONE HOUR	16:45	18:15	15	✓	Simple	D4+D2
D11	2023 + Dev	AM	ONE HOUR	07:45	09:15	15	4	Simple	D3+D5
D12	2023 + Dev	PM	ONE HOUR	16:45	18:15	15	4	Simple	D4+D6
D13	2036 + Dev	AM	ONE HOUR	07:45	09:15	15	✓	Simple	D3+D7
D14	2036 + Dev	PM	ONE HOUR	16:45	18:15	15	✓	Simple	D4+D8

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

2017 + Dev, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Demand Set Relationship	D11 - 2023 + Dev, AM	Demand Set relationships are chained. This may slow down the file.
Warning	Vehicle Mix	4	HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1,2,3,4	4.55	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	Hortham Lane (East)	4
2	Woodlands	4
3	Hortham Lane (West)	4
4	Private Access	4

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1	3.00	5.63	15.5	48.0	32.0	33.0	4
2	3.00	5.38	7.6	38.0	32.0	52.9	4
3	3.00	4.82	6.7	33.0	32.0	80.0	4
4	2.00	5.92	3.3	20.0	36.0	65.0	4

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.611	1451
2	0.536	1198
3	0.469	1018
4	0.421	751

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically	Relationship type	Relationship
D9	2017 + Dev	AM	ONE HOUR	07:45	09:15	15	✓	Simple	D3+D1

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1	4	ONE HOUR	✓	120	100.000
2	4	ONE HOUR	✓	359	100.000
3	4	ONE HOUR	✓	238	100.000
4	4	ONE HOUR	✓	0	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1	2	3	4
From	1	0	0	120	0
	2	0	0	359	0
	3	52	186	0	0
	4	0	0	0	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.10	3.01	0.1	A	110	165
2	0.35	4.92	0.5	A	329	494
3	0.26	4.76	0.3	A	218	328
4	0.00	0.00	0.0	A	0	0

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	90	23	139	1366	0.066	90	39	0.0	0.1	2.821	A
2	270	68	90	1150	0.235	269	139	0.0	0.3	4.080	A
3	179	45	0	1018	0.176	178	359	0.0	0.2	4.283	A
4	0	0	178	676	0.000	0	0	0.0	0.0	0.000	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	108	27	167	1349	0.080	108	47	0.1	0.1	2.899	A
2	323	81	108	1140	0.283	322	167	0.3	0.4	4.398	A
3	214	53	0	1018	0.210	214	430	0.2	0.3	4.475	A
4	0	0	214	661	0.000	0	0	0.0	0.0	0.000	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	132	33	205	1326	0.100	132	57	0.1	0.1	3.014	A
2	395	99	132	1127	0.351	395	205	0.4	0.5	4.908	A
3	262	66	0	1018	0.257	262	527	0.3	0.3	4.758	A
4	0	0	262	641	0.000	0	0	0.0	0.0	0.000	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	132	33	205	1326	0.100	132	57	0.1	0.1	3.014	A
2	395	99	132	1127	0.351	395	205	0.5	0.5	4.916	A
3	262	66	0	1018	0.257	262	527	0.3	0.3	4.761	A
4	0	0	262	641	0.000	0	0	0.0	0.0	0.000	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	108	27	167	1349	0.080	108	47	0.1	0.1	2.903	A
2	323	81	108	1140	0.283	323	167	0.5	0.4	4.408	A
3	214	53	0	1018	0.210	214	431	0.3	0.3	4.482	A
4	0	0	214	661	0.000	0	0	0.0	0.0	0.000	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	90	23	140	1365	0.066	90	39	0.1	0.1	2.825	A
2	270	68	90	1150	0.235	271	140	0.4	0.3	4.097	A
3	179	45	0	1018	0.176	179	361	0.3	0.2	4.295	A
4	0	0	179	676	0.000	0	0	0.0	0.0	0.000	A

2017 + Dev, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Demand Set Relationship	D11 - 2023 + Dev, AM	Demand Set relationships are chained. This may slow down the file.
Warning	Vehicle Mix	4	HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1,2,3,4	5.22	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically	Relationship type	Relationship
D10	2017 + Dev	PM	ONE HOUR	16:45	18:15	15	✓	Simple	D4+D2

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1	4	ONE HOUR	✓	64	100.000
2	4	ONE HOUR	✓	336	100.000
3	4	ONE HOUR	✓	392	100.000
4	4	ONE HOUR	✓	0	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1	2	3	4
From	1	0	0	64	0
	2	0	0	336	0
	3	96	296	0	0
	4	0	0	0	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.06	3.05	0.1	A	59	88
2	0.32	4.55	0.5	A	308	462
3	0.42	6.14	0.7	A	360	540
4	0.00	0.00	0.0	A	0	0

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	48	12	222	1316	0.037	48	72	0.0	0.0	2.839	A
2	253	63	48	1172	0.216	252	222	0.0	0.3	3.905	A
3	295	74	0	1018	0.290	293	300	0.0	0.4	4.958	A
4	0	0	293	628	0.000	0	0	0.0	0.0	0.000	A

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	58	14	266	1289	0.045	57	86	0.0	0.0	2.923	A
2	302	76	57	1167	0.259	302	266	0.3	0.3	4.158	A
3	352	88	0	1018	0.346	352	359	0.4	0.5	5.402	A
4	0	0	352	603	0.000	0	0	0.0	0.0	0.000	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	70	18	325	1252	0.056	70	105	0.0	0.1	3.045	A
2	370	92	70	1160	0.319	369	325	0.3	0.5	4.548	A
3	432	108	0	1018	0.424	431	440	0.5	0.7	6.122	A
4	0	0	431	570	0.000	0	0	0.0	0.0	0.000	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	70	18	326	1252	0.056	70	106	0.1	0.1	3.045	A
2	370	92	70	1160	0.319	370	326	0.5	0.5	4.553	A
3	432	108	0	1018	0.424	432	440	0.7	0.7	6.138	A
4	0	0	432	570	0.000	0	0	0.0	0.0	0.000	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	58	14	267	1288	0.045	58	86	0.1	0.0	2.924	A
2	302	76	58	1167	0.259	303	267	0.5	0.4	4.166	A
3	352	88	0	1018	0.346	353	360	0.7	0.5	5.421	A
4	0	0	353	603	0.000	0	0	0.0	0.0	0.000	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	48	12	223	1315	0.037	48	72	0.0	0.0	2.841	A
2	253	63	48	1172	0.216	253	223	0.4	0.3	3.917	A
3	295	74	0	1018	0.290	296	301	0.5	0.4	4.988	A
4	0	0	296	627	0.000	0	0	0.0	0.0	0.000	A

2036 + Dev, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Demand Set Relationship	D11 - 2023 + Dev, AM	Demand Set relationships are chained. This may slow down the file.
Warning	Vehicle Mix	4	HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1,2,3,4	4.57	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically	Relationship type	Relationship
D13	2036 + Dev	AM	ONE HOUR	07:45	09:15	15	✓	Simple	D3+D7

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1	4	ONE HOUR	✓	138	100.000
2	4	ONE HOUR	✓	359	100.000
3	4	ONE HOUR	✓	246	100.000
4	4	ONE HOUR	✓	0	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1	2	3	4
From	1	0	0	138	0
	2	0	0	359	0
	3	60	186	0	0
	4	0	0	0	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.11	3.06	0.1	A	126	189
2	0.35	4.99	0.5	A	329	494
3	0.27	4.81	0.4	A	225	338
4	0.00	0.00	0.0	A	0	0

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	104	26	139	1366	0.076	103	45	0.0	0.1	2.851	A
2	270	68	103	1143	0.236	269	139	0.0	0.3	4.113	A
3	185	46	0	1018	0.182	184	372	0.0	0.2	4.312	A
4	0	0	184	674	0.000	0	0	0.0	0.0	0.000	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	124	31	167	1349	0.092	124	54	0.1	0.1	2.937	A
2	323	81	124	1132	0.285	322	167	0.3	0.4	4.444	A
3	221	55	0	1018	0.217	221	446	0.2	0.3	4.513	A
4	0	0	221	658	0.000	0	0	0.0	0.0	0.000	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	151	38	205	1326	0.114	151	66	0.1	0.1	3.063	A
2	395	99	151	1117	0.354	395	205	0.4	0.5	4.978	A
3	270	68	0	1018	0.266	270	546	0.3	0.4	4.811	A
4	0	0	270	638	0.000	0	0	0.0	0.0	0.000	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	151	38	205	1326	0.114	151	66	0.1	0.1	3.064	A
2	395	99	151	1117	0.354	395	205	0.5	0.5	4.987	A
3	270	68	0	1018	0.266	270	547	0.4	0.4	4.815	A
4	0	0	270	637	0.000	0	0	0.0	0.0	0.000	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	124	31	167	1349	0.092	124	54	0.1	0.1	2.938	A
2	323	81	124	1132	0.285	323	167	0.5	0.4	4.456	A
3	221	55	0	1018	0.217	221	447	0.4	0.3	4.519	A
4	0	0	221	658	0.000	0	0	0.0	0.0	0.000	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	104	26	140	1365	0.076	104	45	0.1	0.1	2.854	A
2	270	68	104	1143	0.237	271	140	0.4	0.3	4.131	A
3	185	46	0	1018	0.182	185	374	0.3	0.2	4.323	A
4	0	0	185	673	0.000	0	0	0.0	0.0	0.000	A

2036 + Dev, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Demand Set Relationship	D11 - 2023 + Dev, AM	Demand Set relationships are chained. This may slow down the file.
Warning	Vehicle Mix	4	HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1,2,3,4	5.30	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically	Relationship type	Relationship
D14	2036 + Dev	PM	ONE HOUR	16:45	18:15	15	✓	Simple	D4+D8

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1	4	ONE HOUR	✓	73	100.000
2	4	ONE HOUR	✓	336	100.000
3	4	ONE HOUR	✓	406	100.000
4	4	ONE HOUR	✓	0	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1	2	3	4
From	1	0	0	73	0
	2	0	0	336	0
	3	110	296	0	0
	4	0	0	0	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.06	3.07	0.1	A	67	101
2	0.32	4.58	0.5	A	308	462
3	0.44	6.30	0.8	A	372	559
4	0.00	0.00	0.0	A	0	0

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	55	14	222	1316	0.042	55	82	0.0	0.0	2.855	A
2	253	63	55	1169	0.216	252	222	0.0	0.3	3.921	A
3	306	76	0	1018	0.300	304	307	0.0	0.4	5.029	A
4	0	0	304	623	0.000	0	0	0.0	0.0	0.000	A

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	66	16	266	1289	0.051	66	99	0.0	0.1	2.943	A
2	302	76	66	1163	0.260	302	266	0.3	0.3	4.179	A
3	365	91	0	1018	0.358	364	368	0.4	0.6	5.503	A
4	0	0	364	598	0.000	0	0	0.0	0.0	0.000	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	81	20	325	1252	0.064	81	121	0.1	0.1	3.071	A
2	370	92	81	1155	0.320	369	325	0.3	0.5	4.579	A
3	447	112	0	1018	0.439	446	450	0.6	0.8	6.295	A
4	0	0	446	564	0.000	0	0	0.0	0.0	0.000	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	81	20	326	1252	0.064	81	121	0.1	0.1	3.072	A
2	370	92	81	1155	0.320	370	326	0.5	0.5	4.585	A
3	447	112	0	1018	0.439	447	451	0.8	0.8	6.303	A
4	0	0	447	563	0.000	0	0	0.0	0.0	0.000	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	66	16	267	1288	0.051	66	99	0.1	0.1	2.944	A
2	302	76	66	1163	0.260	303	267	0.5	0.4	4.187	A
3	365	91	0	1018	0.358	366	368	0.8	0.6	5.528	A
4	0	0	366	597	0.000	0	0	0.0	0.0	0.000	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	55	14	223	1315	0.042	55	83	0.1	0.0	2.857	A
2	253	63	55	1169	0.216	253	223	0.4	0.3	3.935	A
3	306	76	0	1018	0.300	306	308	0.6	0.4	5.060	A
4	0	0	306	622	0.000	0	0	0.0	0.0	0.000	A

APPENDIX F: VISSIM MODELLING RESULTS

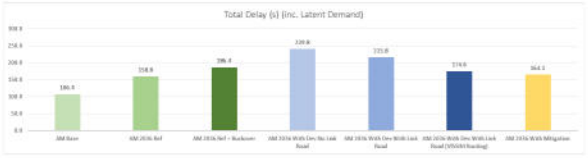
OVERALL NETWORK PERFORMANCE

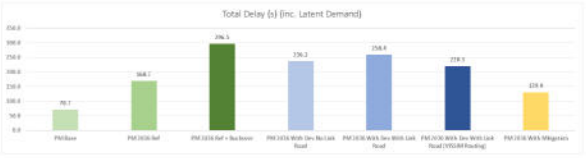
08:00-09:00

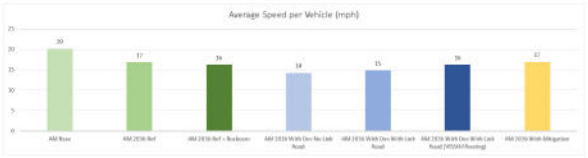
	AM Base	AM 2036 Ref	AM 2036 Ref + Buckover	AM 2036 With Dev No Link Road	AM 2036 With Dev With Link Road	AM 2036 With Dev With Link Road (VISSIM Routing)	AM 2036 With Mitigation
Average Delay per Vehicle (s)	106	146	156	192	182	159	148
Average Speed per Vehicle (mph)	20	17	16	14	15	16	17
Total Travel Time (hrs)	891	1204	1281	1458	1419	1356	1299
Total Delay Time (hrs)	464	725	790	965	920	821	763
Vehicles Active in the Network	1046	1465	1576	1716	1684	1619	1532
Vehicles Completed Trip	14684	16453	16834	16371	16471	16948	16989
Total Latent Delay (hrs)	1	71	169	282	209	90	92
Total Latent Demand	12	196	304	428	541	204	219
Total Peak Hour Veh Numbers	15742	18054	18514	18715	18696	18771	18751
Average Delay per Veh (s) (inc. Latent Demand)	109.4	158.8	186.4	239.8	215.8	174.8	164.1

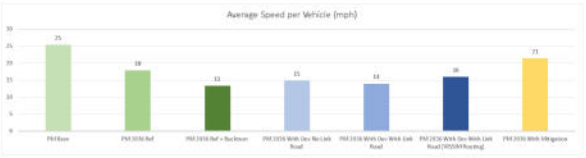
17:00-18:00

	PM Base	PM 2036 Ref	PM 2036 Ref + Buckover	PM 2036 With Dev No Link Road	PM 2036 With Dev With Link Road	PM 2036 With Dev With Link Road (VISSIM Routing)	PM 2036 With Mitigation
Average Delay per Vehicle (s)	70	139	214	188	203	170	102
Average Speed per Vehicle (mph)	25	18	13	15	14	16	21
Total Travel Time (hrs)	779	1249	1635	1548	1628	1496	1143
Total Delay Time (hrs)	321	732	1131	1016	1100	915	558
Vehicles Active in the Network	629	1226	1766	1599	1789	1596	938
Vehicles Completed Trip	15899	17699	17285	17828	17682	17979	18768
Total Latent Delay (hrs)	4	162	502	290	352	300	159
Total Latent Demand	0	151	763	443	480	440	161
Total Peak Hour Veh Numbers	16528	19076	19814	19870	19950	20015	19867
Average Delay per Veh (s) (inc. Latent Demand)	70.7	168.7	296.5	236.2	258.4	220.5	129.9









vectos
microsimulation specialists

Woodlands Bristol VISSIM Model
Local Model Validation Report

July 2017

Cornwall Buildings, 45 Newhall Street, Birmingham B3 3QR www.vectos.co.uk
Registered address: Vectos Microsim Limited, 82 St John Street, London EC1M 4JN Company no. 9322829

Contents

1 INTRODUCTION 1

Background 1
Scope 1
Report Structure 3

2 MODEL SPECIFICATION & SURVEY DATA 4

Manual Classified Counts (MCC) 5
Automatic Traffic Counts (ATCs) 5
Journey Times 7
Video Footage 8

3 BASE MODEL DEVELOPMENT 9

Network Structure 9
Time Periods 10
Vehicle Speeds 10
Priority Rules & Conflict Areas 10
Signalised Junctions 11
Public Transport 11
Matrix Estimation 12
M5 Mainline Flows 14

4 MODEL CALIBRATION 16

Calibration Criteria 16
Turn and Link Count Calibration 17

5 MODEL VALIDATION 19

Link Validation 19
Journey Time Analysis 20

6 SUMMARY AND CONCLUSIONS 21

Figures

Figure 1: Model Extent 2
Figure 2: MCC and ATC Survey Locations 6
Figure 3: Surveyed Journey Time Routes 7
Figure 4: Network Extent 9
Figure 5: MIDAS Loop Locations 15

Tables

Table 1: Zone Numbers and Locations 13
Table 2: MIDAS Loop I.Ds 14
Table 3: Calibration Statistics Summary 18
Table 4: Link Validation Statistics Summary 19
Table 5. AM & PM Journey Time Validation Results 20

Appendices

Appendix A: Full Calibration & Validation Results

1 INTRODUCTION

Background

1.1 Vectos Microsim (VM) has been appointed by Vectos South (VS) to develop a new 2017 VISSIM Base model of M5 Junction 16 and the surrounding network which can be subsequently used to undertake development impact assessments in the locality.

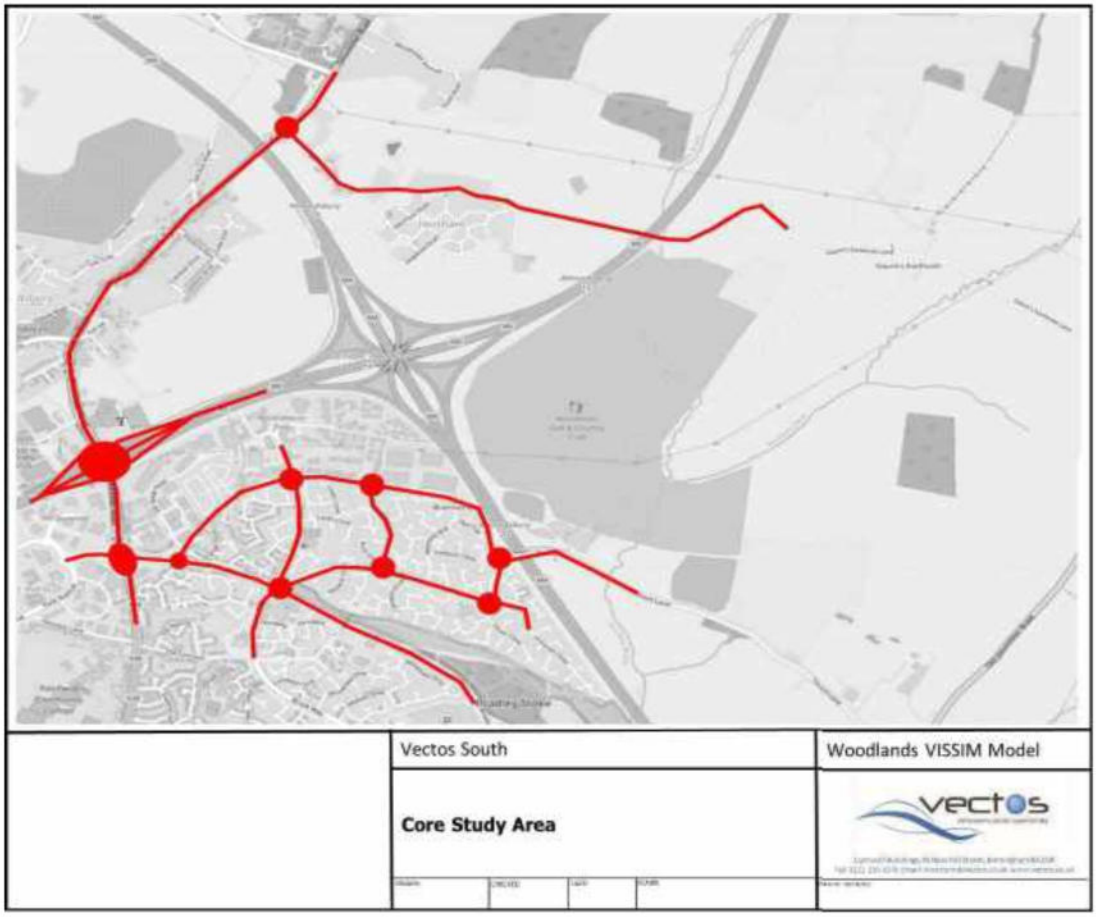
1.2 This report summarises the steps taken to develop the Base model and presents an assessment of the respective model calibration and validation in line with the study brief.

Scope

1.3 The model has been created using VISSIM version 9.00-07, and developed afresh using OS data provided by VS, and the background Bing maps add-on in VISSIM. The model includes M5 J16 and the Aztec West Roundabout just to the south as its central focal point, extending northwards to the A38 Gloucester Road/Hortham Lane junction and eastwards to Trench Lane.

1.4 The core study area of the model is illustrated in Figure 1 below:

Figure 1: Model Extent



Report Structure

1.5 The remainder of the report is set out as follows:

- Chapter 2 – Summarises the general model settings used in the resulting model, the assessment criteria adhered to in its development, and the observed data that was available and used in the model's development
- Chapter 3 – Summarises the VISSIM parameters used in model development, and the process of updating the previous 2008 Base to present day conditions
- Chapter 4 – Presents the model calibration assessments
- Chapter 5 – Presents the model validation assessments
- Chapter 6 – Provides a summary and the conclusions

2 MODEL SPECIFICATION & SURVEY DATA

2.1 The model has been developed and validated with the following specifications:

- **VISSIM Version**:
  - 9.00-07
- **Base Year**:
  - 2017
- **Simulation Periods (Evaluation Periods):**
  - AM: 07:30-09:30 (08:00-09:00)
  - PM: 16:30-18:30 (17:00-18:00)
- **Assignment Method:**
  - Dynamic Assignment
- **Assessment Criteria**
  - Network calibration assessed against observed 2017 Manual Classified Turn Counts (MCCs) at 10 junctions, and supporting video footage
  - Model validation assessed against 2017 ATC Link Count data at 6 bi-directional sites, and Journey Times surveys comprising 4 complete routes

2.2 The following data has been utilised in the development of the 2017 Base model.

Manual Classified Counts (MCC)

2.3 MCCs were undertaken by the survey company MHC Traffic Limited on Tuesday 13th June 2017 at the following locations:

- M5 East/A38 Gloucester
- A38 Gloucester Road/Bradley Stoke Way/Park Avenue
- Bradley Stoke Way/Pear Tree Road/Bowsland Way/Brook Way
- A38 Gloucester Road/Hortham Lane
- Bradley Stoke Way/Woodlands Lane
- Woodlands Lane/Great Park Road/Pear Tree Road
- Woodlands Lane/Foxfield Avenue
- Foxfield Avenue/Bowsland Way
- Trench Lane/Ormonds Close/Ellicks Close/Bowsland Way
- Woodlands Lane/Trench Lane

2.4 Data for all MCC site locations was collected at 15-minute intervals and disaggregated by vehicle type.

2.5 When processed these junction surveys equated to a total of 122 turning movements for each modelled peak hour. These turning movements were used to assess the relationship between modelled and observed flows during model calibration.

Automatic Traffic Counts (ATCs)

2.6 To supplement the MCCs, ATCs were also commissioned to ensure that the MCC counts taken on a single day were representative of flows across an extended weekly period. ATC data provides an independent check of the validity of the MCC counts.

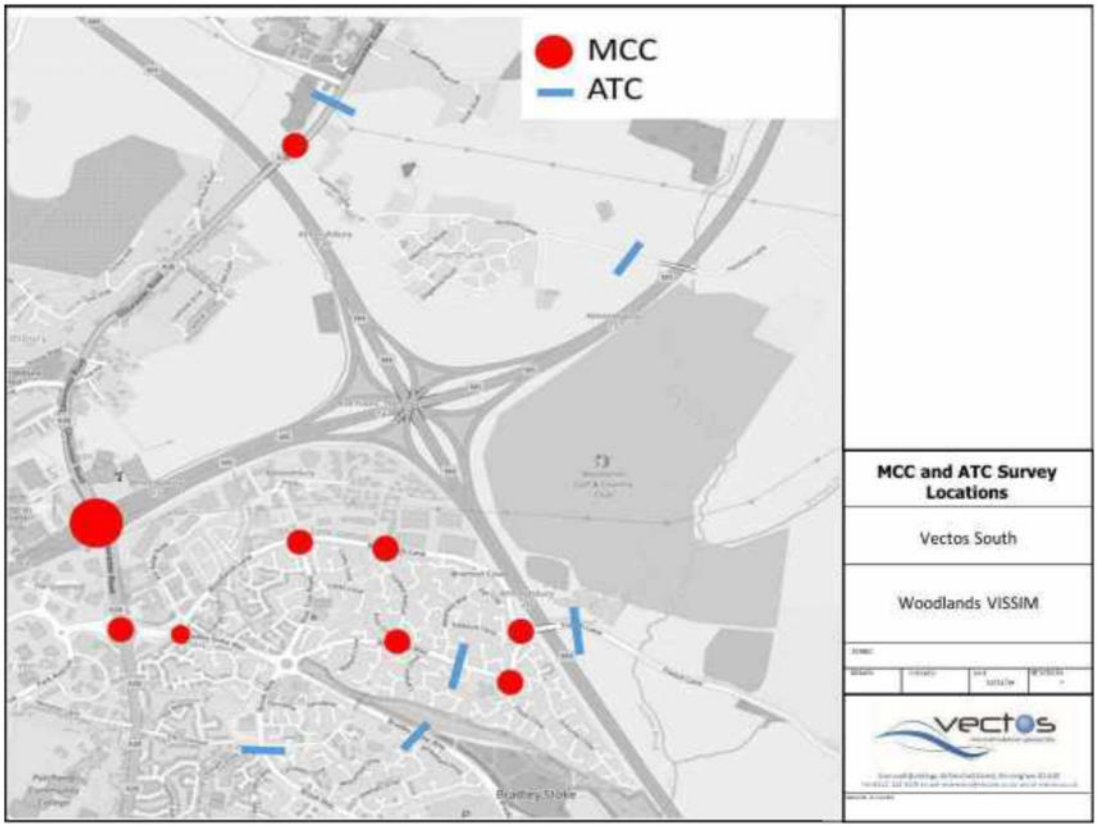
2.7 6 ATC sites were selected and surveyed by MHC Traffic across various different days in June, providing at least one week of data with which to derive average weekday traffic flows.

2.8 These sites are listed below:

- A38 Gloucester Road North
- Hortham Lane
- Trench Lane
- Bowsland Way
- Bradley Stoke Way
- Brook Way

2.9 The following figure presents the location of all MCC junction and ATC link counts:

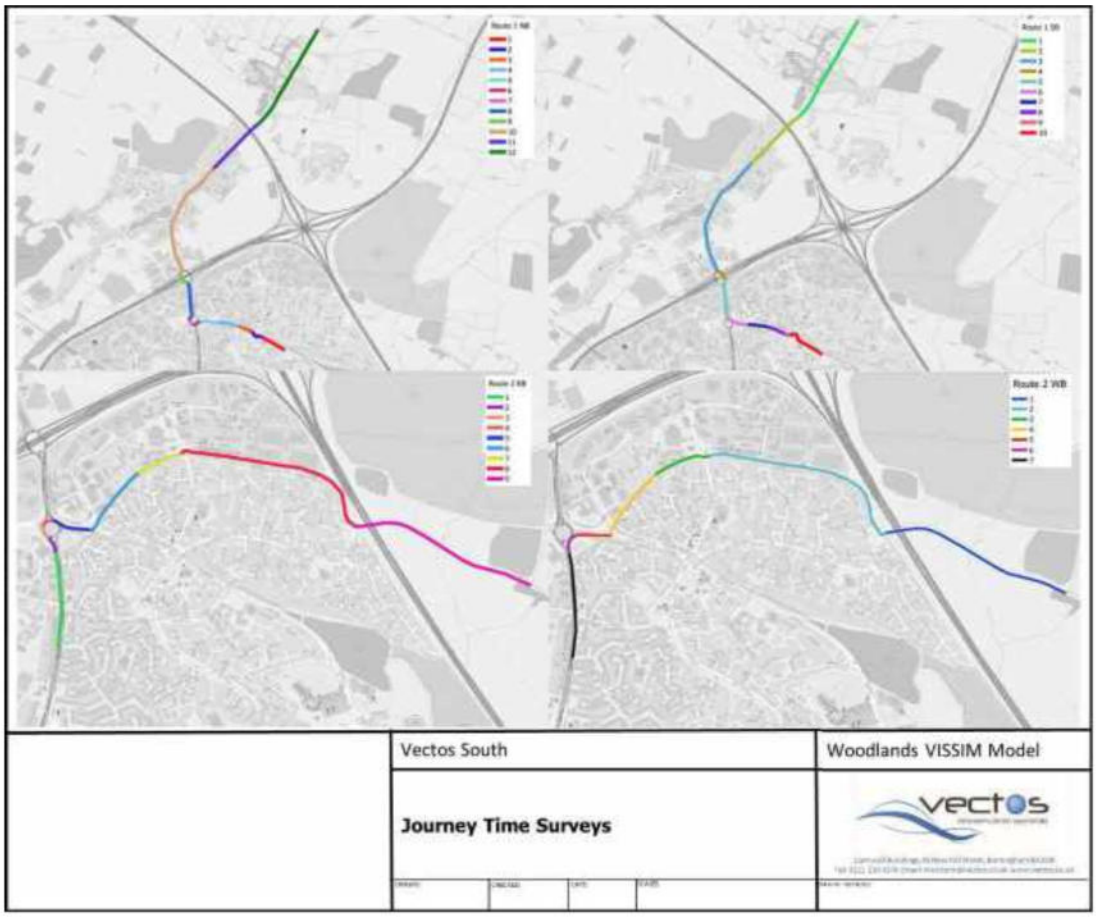
Figure 2: MCC and ATC Survey Locations



Journey Times

2.10 2017 Journey Times were also carried out by MHC Traffic Limited along 2 separate bi-directional routes, resulting in four complete journey time paths as illustrated in the Figure below:

Figure 3: Surveyed Journey Time Routes



2.11 Each of these routes is further sub-divided into sections, as shown in the image. The routes extend across the following:

- Route 1 Northbound: Bradley Stoke Way to A38 Gloucester Road North, via Aztec West Roundabout, M5 J16 and the Hortham Lane junction
- Route 1 Southbound: as above, in the reverse direction
- Route 2 Eastbound: A38 Gloucester Road South to Trench Lane, via Aztec West Roundabout and Woodlands Lane
- Route 2 Westbound: as above, in the reverse direction

Video Footage

2.12 Video surveys were also carried out at three primary junctions within the study area:

- M5 J16
- Aztec West Roundabout
- Bradley Stoke Way/Pear Tree Road/Bowsland Way/Brook Way

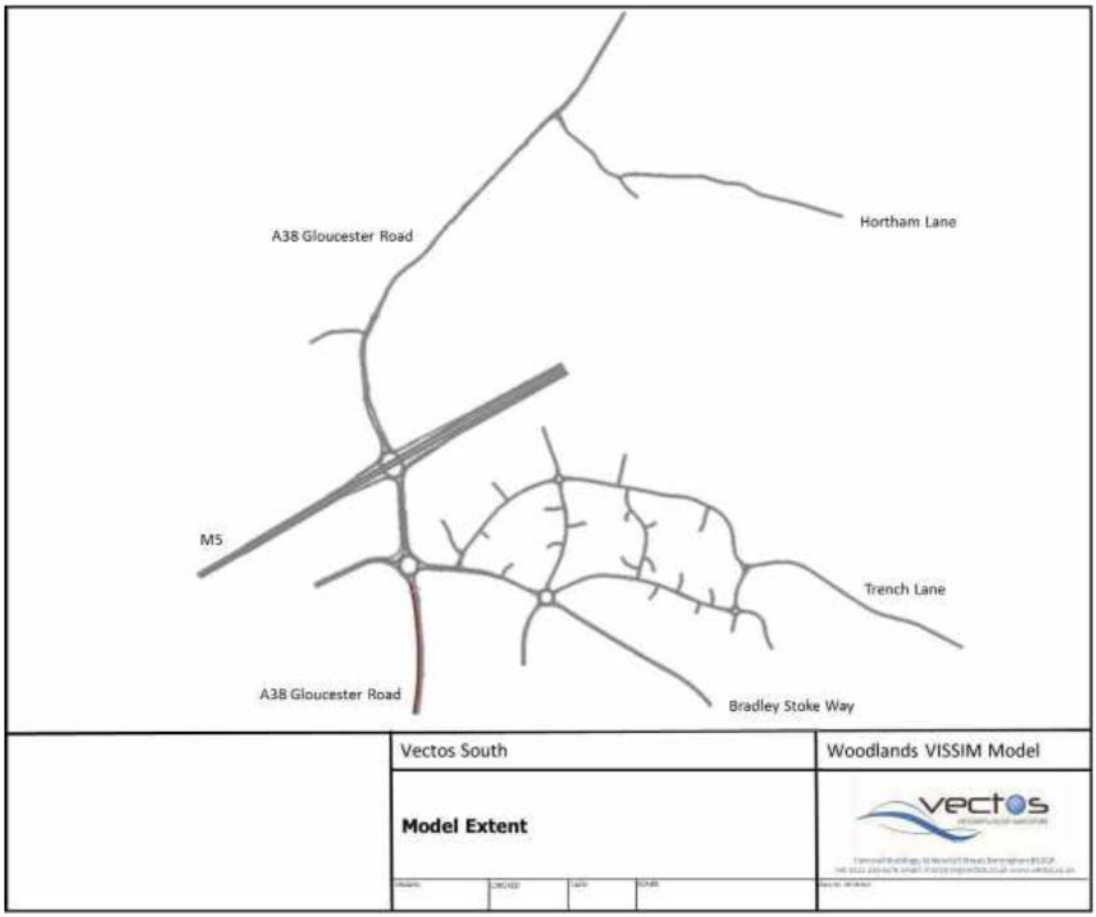
2.13 This footage was consulted during development of the Base model to ensure queue profiles and network geometry were representative of on street conditions.

3 BASE MODEL DEVELOPMENT

Network Structure

3.1 The general network extent is presented in Figure 6 below:

Figure 4: Network Extent



3.2 VM is aware that during the data collection period, roadworks were present at and around Aztec West Roundabout. For the purposes of base model development, and to ensure connection with survey data is maintained, the network was coded as per the network operation at the time the surveys were collected. It is accepted that this is likely to be different to the pre and post-roadworks network operation, but it does provide an accurate representation of the network through which the surveyed data has been obtained.

3.3 Should the Base model be used for model forecasting, the network should be reviewed in line with the expected alignment at the time of the forecast year and, if necessary, adjustments should be made to traffic demands to account for the constrained throughput resulting from the roadworks at the time the base model was developed.

Time Periods

3.4 The VISSIM model has been developed for AM and PM peak hours, with a 30 minute warm up and cool down period included before and after the peak. These peak hours were determined through analysis of the observed turn count data across the 3 hours provided for each peak period.

3.5 The model has been developed using 15-minute matrices to cover the entire model period. Each 15-minute time interval, for warm-up, peak and cool-down, includes a matrix for Light vehicles and a matrix for Heavies, informed mainly by the MCC survey counts. The process of matrix development is discussed in more detail in the *Matrix Estimation* section.

Vehicle Speeds

3.6 Desired speed decisions have been included at locations in the network where speed limit changes are enforced. The speed distribution curves that provide the range of speeds permitted for vehicles to travel within each speed limit bracket have been calculated through interrogation of DfT statistics of Free Flow Vehicle Speeds[1]. Speeds are applied on the basis of vehicle class (i.e. Heavy vehicles are subject to lower speed controls than Lights).

3.7 Other areas in the network, where localised speed changes are necessary (i.e. where curves in road geometry/approaches to junctions would require vehicles to reduce speeds), are controlled by reduced speed areas, which temporarily reduce a vehicle's desired speed. Again the distribution curves that inform these speeds are calculated by DfT statistics, and the speeds included are 1) based on sensible estimations of a vehicle's speed on a particular area of the network, and 2) used as a calibration tool to ensure realistic throughput at junction approaches, as noted in MCC counts and video footage, is reflected within the model.

Priority Rules & Conflict Areas

3.8 Priority Rules and/or Conflict Areas have been included at all give-way junctions and priority controlled roundabouts to ensure vehicle movements through and around junctions are realistic and that 'vehicle crossover' in the model is limited.

[1] Dft, *Vehicle free flow speeds by road type and vehicle type in Great Britain: 2015,* June 2016, Table SPE0111

3.9 Priority rules were also added at specific locations to represent yellow boxes and courtesy let-in behaviour. This enables the model to accurately reflect on-street driving etiquette at heavily-congested locations where vehicles will often allow space in front to prevent blocking a junction, whilst also helping to minimise the possibility of the network locking up.

Signalised Junctions

3.10 The model extent includes five signalised junctions:

- M5 J16
- Aztec West Roundabout
- Bradley Stoke Way/Woodlands Lane
- A38 Gloucester Road/Hortham Lane
- Bradley Stoke Way/Orchard Gate

3.11 For the first three junctions, LinSig models provided the necessary intergreens and signal staging. Green times for each phase within a junction were adjusted as part of the model calibration process; video footage shows that on-street, green times for these signals are reactive to demand and so LinSig times should not be applied too rigidly.

3.12 The A38 Gloucester Road/Hortham Lane junction signal times were informed by video footage, which provided the staging of the junction. Again on street this junction operates on variable demand times but for the purposes of the VISSIM model, fixed time signals were included using average green times across the junction. For the final junction, a realistic signal plan was devised by VM to replicate the operation on street.

Public Transport

3.13 A review of public transport provision across the network was carried out to ensure all bus routes were represented within the modelling. The following bus routes are all represented in the model:

- 77
- 78/79
- S7C
- 73
- 963

3.14 Online timetables were used to identify predominant bus routes through the network, and to generate start times for these routes. These were then cross-checked with bus turn counts recorded in the classified turn counts and timetables were adjusted accordingly.

Matrix Estimation

3.15 MCC data formed the basis for the matrix estimation process, as these provide the counts that need to be matched in the model in order to achieve model calibration. As VISSIM does not include a built-in matrix estimation module that can be used to automatically calculate matrices based on desired link and/or turn counts, this was carried out through spreadsheet calculations which involved a series of processes designed to create realistic O-D patterns using only junction turn count data and land use observations.

3.16 Firstly, MCC data was processed to give 15-minute counts for all junctions. Many of these surveys are located at the edge of the model extent, meaning that certain O-D movements are known (as the origin and destination zones are both external to the network). These counts were maintained through the matrix estimation process.

3.17 All remaining O-D movements were calculated proportionally based on successive turning movement proportions, meaning that a total count from a particular zone is distributed across all remaining zones in the network. Due to the route choice within the model, the shortest route was assumed as the contributor to each O-D movement.

3.18 As there are multiple route possibilities through the network, and trips may start and/or end at other areas within the network that have not been surveyed, additional zones were added into the network to produce and attract trips elsewhere in the network.

3.19 The total list of zones included in the network is as follows:

Table 1: Zone Numbers and Locations

Zone Number	Location	Surveyed?
1	A38 Gloucester Road (East)	Yes
2	Hortham Lane	Yes
3	M5 (East)	Yes
4	M5 (West)	Yes
5	Park Avenue	Yes
6	A38 Gloucester Road (South)	Yes
7	Brook Way	Yes
8	Bradley Stoke Way (East)	Yes
9	Great Park Road	Yes
10	Ellicks Close	Yes
11	Ormonds Close	Yes
12	Trench Lane (East)	Yes
13	Over Lane	No
14	Woodlands Park	No
15	Orchard Gate	No
16	Ottrells Mead/Cooks Close/Apseleys Mead	No
17	Badgers Close/Warren Close/Foxborough	No
18	Business Park	No
19	Westfield Way North	No
20	Westfield Way South	No
22	Hickory Lane	No

3.20 Total vehicle numbers beginning or ending their trip at an un-surveyed zone were informed by a) the land use and estimated trip numbers associated to that zone, and b) known in/out trips necessary to make up any shortfall or reduce trip numbers between upstream and downstream junctions, identified through the development of an hourly schematic diagram of the network.

3.21 For example, A38 Gloucester Road/Hortham Lane junction and M5 J16 were both surveyed. It is therefore known the southbound A38 movements from the Hortham Lane junction, and the southbound A38 movements approaching the M5 J16 junction. Any difference between these values will be the result of the un-surveyed junctions in-between, either removing or adding trips to the link. In this case, the assumed largest contributor to this (Over Lane) was coded into the model (Zone number 13) and realistic in/out trip numbers were included to assist the calibration of both Hortham Lane and M5 J16 junctions.

3.22 Large residential areas in the middle of the network (between Woodlands Lane and Bradley Stoke Way/Bowsland Way) were also included to ensure a more realistic model operation, ensuring trips passing through Pear Tree Road and Foxfield Avenue were not only external through trups, but also trips originating at the surrounding residential streets.

3.23 Employment centres at the west (off Ash Ridge Road) and the north of Woodlands Lane were also included.

3.24 Distribution for these un-surveyed zones were informed using the same process of proportional turn counts, ensuring that all resulting O-D movements were realistic (i.e. residential to residential and employment to employment trips were restricted to prevent artificial 'trip-dumping').

3.25 The final stage of the matrix estimation process involved the application of some global factors to account for some trips getting lost in the turn count proportion methodology (because of the numerous routes open to vehicles), and some manual adjustments of specific O-D absolute values where considered necessary to meet turn count calibration targets.

M5 Mainline Flows

3.26 MCC counts provided the numbers of vehicles on the M5 on and off-slips at Junction 16, but not the mainline flows passing through the junction. To inform these flows, Highways England (HE) online database WebTRIS was explored.

3.27 The database holds 15-minute vehicular flows for various locations between January 2017-April 2017. These were processed to filter out weekend results to provide average 15-minute flows for both AM and PM peak hours at the following three locations:

Table 2: MIDAS Loop I.Ds

Number	Location	MIDAS Loop I.D.	Grid Reference
1	**Northbound within M5 J16**	M5/8325B	360475 , 183183
2	**Northbound (continuing)**	M5/8315B	361376 , 183646
3	**Southbound within M5 J16**	M5/8324A	360566 , 183214

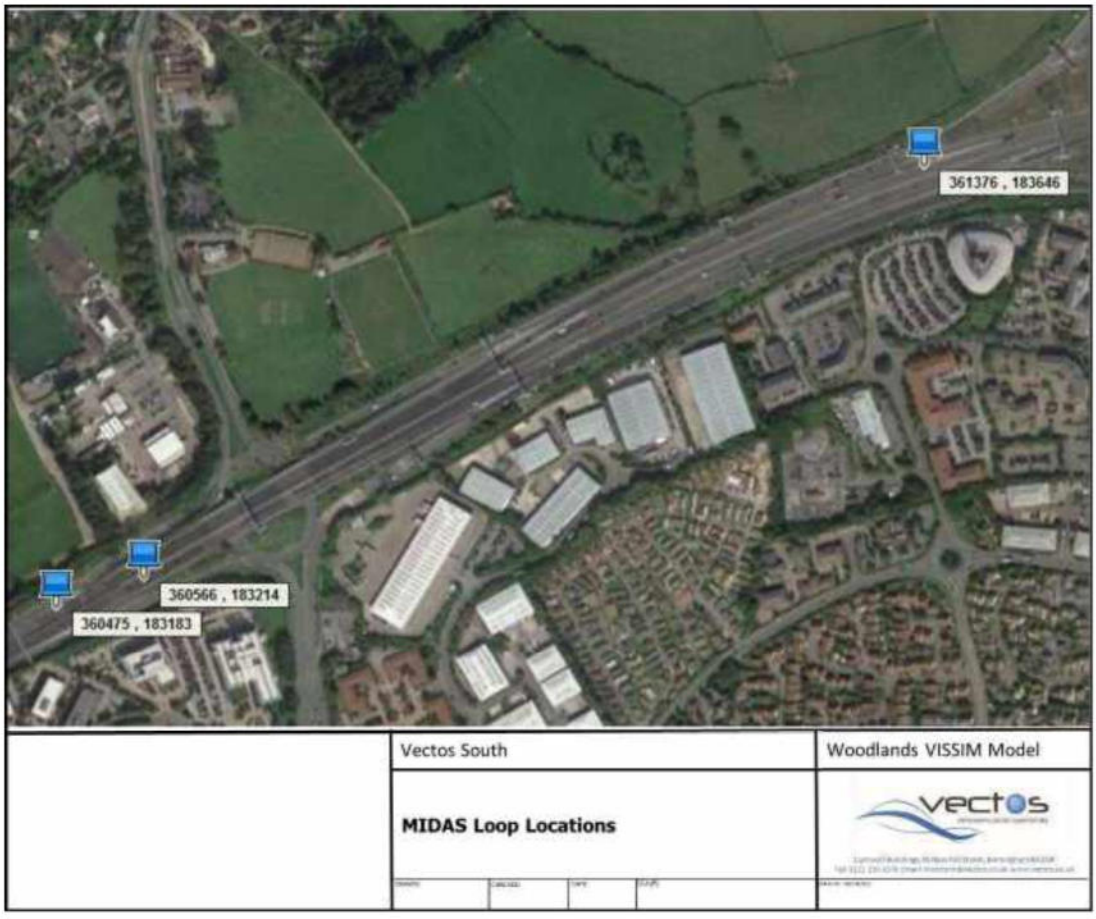
1. Northbound within M5 J16 – this provided the total vehicle numbers passing through the junction. This, plus the total vehicle numbers on M5 J16 eastbound off-slip as informed by the MCC, equals the originating zone total for M5 West zone (no.4)

2. Northbound (continuing) – this provided the total trip numbers continuing through both J15 and J16 on M5 mainline (i.e. not using the northbound distributor that allows vehicles to exit the mainline at J16). In turn, this provided the vehicle numbers that *do* use the distributor (by subtracting this value from Loop I.D. 8325B).

3. Southbound within M5 J16 – this provided the total vehicle numbers passing through the junction in a southbound direction.

3.28 The MIDAS loops used are shown in the Figure below:

Figure 5: MIDAS Loop Locations



4 MODEL CALIBRATION

Calibration Criteria

4.1 Flow calibration is a process whereby modelled flow outputs are compared to the equivalent observed traffic flows across the network.

4.2 The Geoffrey E. Havers (GEH) statistic is a standard way of comparing the observed and modelled flows, as defined in DMRB, Volume 12, Chapter 4. The GEH value is similar to a chi-squared test and also incorporates both relative and absolute errors in order to give an overall measure of the accuracy of the modelled flow.

4.3 The GEH statistic has the benefit of removing bias that exists when comparing flows of different magnitudes using percentages, such that a difference of 10 in a flow of 100 vehicles per hour (vph) is less significant (GEH = 1) than a difference of 100 in a flow of 1000 vph (GEH = 3.2).

4.4 The GEH statistic is calculated by:

$$GEH = \sqrt{\frac{(M-C)^2}{(M+C)/2}}$$

where:

GEH = GEH statistic

M = Modelled flow

C = Observed flow

4.5 Dft guidance indicates that the GEH statistics should be less than 5.0 for 85% of comparisons between observed and modelled hourly flows.

4.6 Furthermore, the difference between observed and modelled link flows is also examined. DfT provides guidance for acceptable absolute or percentage differences in observed vehicles per hour (vph) in DMRB as follows:

- For observed flows < 700 vph, modelled flow within 100 vph of observed flow
- For observed flows 700-2,700 vph, modelled flow within 15% of observed flow
- For observed flows > 2,700 vph, modelled flow within 400 vph of observed flow

4.7 Again, 85% of hourly flows should be within this criteria.

Turn and Link Count Calibration

4.8 10 MCC sites were used to inform the development of the demand matrices and are therefore used to inform calibration of the network. This provided a total calibration target of 122 counts.

4.9 The full set of AM and PM turn and link count calibration results can be found in Appendix A.

4.10 A summary of the calibration results for all peak periods and for all datasets is provided in the table overleaf:

Table 3: Calibration Statistics Summary

Turn Count Calibration (GEH)				
	AM		PM	
Counts	122		301	
	Pass	%	Pass	%
<3	102	83.6%	101	82.8%
<4	113	92.6%	114	93.4%
<5	118	96.7%	119	97.5%
<6	121	99.2%	122	100.0%
<7	121	99.2%	122	100.0%
<8	121	99.2%	122	100.0%
<9	122	100.0%	122	100.0%
Link Flow Calibration				
	AM		PM	
Counts	72		72	
<700 veh	*within 100*		*within 100*	
pass	47	100.0%	49	100.0%
fail	0	0.0%	0	0.0%
700-2700	*<15%*		*<15%*	
pass	23	100.0%	23	100.0%
fail	0	0.0%	0	0.0%
>2700 vehs	*within 400*		*within 400*	
pass	2	-	0	-
fail	0	-	0	-
TOTAL				
pass	72	100.0%	72	100.0%
fail	0	0.0%	0	0.0%
Summary				
	AM		PM	
Turn GEH<5	96.7%		97.5%	
Link Flow	100.0%		100.0%	

4.11 The results show that both AM and PM models surpass DMRB standards in regards to turn and link flow calibration. These measures combined demonstrate that the model is accurately representing turn movements at each junction, and link flows on approaches and exits to these junctions.

5 MODEL VALIDATION

Link Validation

5.1 As described in Chapter 2, a number of sites were available for which link count data could be used for the purposes of validation. As these datasets were not used during the matrix development process they can be used to provide an independent check of modelled flows.

5.2 The table below provides a summary of AM and PM peak hour link flow validation statistics:

Table 4: Link Validation Statistics Summary

Link Validation (GEH)				
	AM		PM	
Counts	12		12	
	Pass	%	Pass	%
<3	8	66.7%	9	75.0%
<4	10	83.3%	12	100.0%
<5	12	100.0%	12	100.0%
<6	12	100.0%	12	100.0%
<7	12	100.0%	12	100.0%
<8	12	100.0%	12	100.0%
<9	12	100.0%	12	100.0%
<10	12	100.0%	12	100.0%
Link Flow Validation				
	AM		PM	
<700 veh	*within 100*		*within 100*	
pass	10	100.0%	9	100.0%
fail	0	0.0%	0	0.0%
700-2700	*<15%*		*<15%*	
pass	2	100.0%	3	100.0%
fail	0	0.0%	0	0.0%
>2700 vehs	*within 400*		*within 400*	
pass	0	-	0	-
fail	0	-	0	-
TOTAL				
pass	12	100.0%	12	100.0%
fail	0	0.0%	0	0.0%
Summary				
	AM		PM	
GEH<5	100.0%		100.0%	
Flow	100.0%		100.0%	

5.3 Both AM and PM link validation results show that 100% of the 12 link counts (6 locations, 2 directions) exhibit a GEH of less than 5 and meet DfT's link flow criteria. As a result both models can be considered to be well validated to observed link flows.

Journey Time Analysis

5.4 As identified in Chapter 2, journey time surveys were carried out along four separate routes. TAG Unit M3.1 outlines that for 85% of the modelled routes, the difference between the observed and modelled journey times should not be more than 15% (or 1 minute, if higher).

5.5 The table below details the AM and PM journey time results for each journey time section:

Table 5. AM & PM Journey Time Validation Results

		AM				PM			
I.D	**Description**	**Obs.**	**Mod.**	**Diff**	**Pass?**	**Obs.**	**Mod.**	**Diff**	**Pass?**
Route 1 NB	Bradley Stoke Way to A38 Gloucester Road North	485	496	11	Pass	421	473	52	Pass
Route 1 SB	A38 Gloucester Road North to Bradley Stoke Way	494	534	39	Pass	458	437	21	Pass
Route 2 EB	A38 Gloucester Road South to Trench Lane	354	409	55	Pass	364	371	6	Pass
Route 2 WB	Trench Lane to A38 Gloucester Road South	396	377	19	Pass	471	402	69	Pass

5.6 The results above show that in both AM and PM models, 100% of the journey time sections validate to within TAG criteria highlighted above.

5.7 Each full route presented above is broken down further into journey time sections (as detailed in Figure 3). Full results for each section can be found in Appendix A. Results show that based on DMRB criteria, all individual sections also adhere to standards).

6 SUMMARY AND CONCLUSIONS

6.1 Vectos Microsim (VM) has been appointed by Vectos South (VS) to create a new 2017 VISSIM Base model of M5 J16 and the surrounding network in order to provide the foundation for development testing in the area.

6.2 The model has been developed using VISSIM version 9.00-07, and includes M5 J16, Aztec West Roundabout at the centre, stretching westwards to Bradley Stoke Way, Woodlands Lane and Trench Lane and northwards to the junction between A38 Gloucester Road and Hortham Lane.

6.3 The model has drawn upon a large pool of observed data including MCC turn counts, ATC link counts, surveyed journey time data and video footage.

6.4 The results presented in this document demonstrate that the modelled outputs correlate closely with all of the above datasets and as a result, all models can be considered to be robust tools with which to test any future year scheme appraisal or development impact assessment.

Appendix A

Junction No.	Junction Description	From Arm	To Arm	08:00-09:00									08:00-09:00				
				Observed			Modelled			GEH			TOTAL VEHICLES SUMMARY				
				Lights	Heavies	Buses	Lights	Heavies	Buses	Lights	Heavies	Buses	Observed	Modelled	Difference	%	GEH
Site 1	M5 East / A38 Gloucester	M5 (East)	A38 Gloucester Road (South)	1808	29	3	1734	35	0	1.8	1.1	2.4	1840	1769	-71	4%	1.7
Site 1	M5 East / A38 Gloucester	M5 (East)	M5 (West)	3	0	0	0	0	0	2.4	0.0	0.0	3	0	-3	100%	2.4
Site 1	M5 East / A38 Gloucester	M5 (East)	A38 Gloucester Road (North)	218	14	0	227	6	0	0.6	2.5	0.0	232	233	1	0%	0.1
Site 1	M5 East / A38 Gloucester	M5 (East)	M5 (East)	2	0	0	2	0	0	0.0	0.0	0.0	2	2	0	0%	0.0
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	M5 (West)	336	9	3	367	10	0	1.7	0.3	2.4	348	377	29	8%	1.5
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	A38 Gloucester Road (North)	363	4	14	366	8	16	0.2	1.6	0.5	381	390	9	2%	0.5
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	M5 (East)	431	23	4	452	14	0	1.0	2.1	2.8	458	466	8	2%	0.4
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	A38 Gloucester Road (South)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 1	M5 East / A38 Gloucester	M5 (West)	A38 Gloucester Road (North)	323	12	0	321	10	0	0.1	0.6	0.0	335	331	-4	1%	0.2
Site 1	M5 East / A38 Gloucester	M5 (West)	M5 (East)	18	0	0	0	0	0	6.0	0.0	0.0	18	0	-18	100%	6.0
Site 1	M5 East / A38 Gloucester	M5 (West)	A38 Gloucester Road (South)	821	14	0	772	19	0	1.7	1.2	0.0	835	791	-44	5%	1.5
Site 1	M5 East / A38 Gloucester	M5 (West)	M5 (West)	3	0	0	0	0	0	2.4	0.0	0.0	3	0	-3	100%	2.4
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	M5 (East)	201	10	0	191	15	0	0.7	1.4	0.0	211	206	-5	2%	0.3
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	A38 Gloucester Road (South)	546	4	11	514	12	11	1.4	2.8	0.0	561	537	-24	4%	1.0
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	M5 (West)	332	27	0	305	23	0	1.5	0.8	0.0	359	328	-31	9%	1.7
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	A38 Gloucester Road (North)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	A38 Gloucester Road (South)	231	4	7	228	1	3	0.2	1.9	1.8	242	232	-10	4%	0.6
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	Park Avenue	357	0	1	328	0	0	1.6	0.0	1.4	358	328	-30	8%	1.6
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	A38 Gloucester Road (North)	536	14	6	586	5	6	2.1	2.9	0.0	556	597	41	7%	1.7
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	Bradley Stoke Way	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	Park Avenue	325	1	6	324	0	0	0.1	1.4	3.5	332	324	-8	2%	0.4
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	A38 Gloucester Road (North)	476	16	9	481	21	10	0.2	1.2	0.3	501	512	11	2%	0.5
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	Bradley Stoke Way	304	4	6	266	0	5	2.3	2.8	0.4	314	271	-43	14%	2.5
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	A38 Gloucester Road (South)	59	0	0	54	0	0	0.7	0.0	0.0	59	54	-5	8%	0.7
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	A38 Gloucester Road (North)	115	5	6	114	6	0	0.1	0.4	3.5	126	120	-6	5%	0.5
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	Bradley Stoke Way	66	1	2	59	0	0	0.9	1.4	2.0	69	59	-10	14%	1.3
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	A38 Gloucester Road (South)	37	1	0	35	2	0	0.3	0.8	0.0	38	37	-1	3%	0.2
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	Park Avenue	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	Bradley Stoke Way	919	12	4	937	23	1	0.6	2.6	1.9	935	961	26	3%	0.8
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	A38 Gloucester Road (South)	913	30	8	824	31	9	3.0	0.2	0.3	951	864	-87	9%	2.9
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	Park Avenue	1345	4	2	1225	8	0	3.3	1.6	2.0	1351	1233	-118	9%	3.3
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	A38 Gloucester Road (North)	0	1	0	0	0	0	0.0	1.4	0.0	1	0	-1	100%	1.4
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Bowsland Way	7	0	0	15	0	0	2.4	0.0	0.0	7	15	8	114%	2.4
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Bradley Stoke Way (East)	55	0	0	93	0	0	4.4	0.0	0.0	55	93	38	69%	4.4
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Brook Way	60	0	2	93	0	0	3.8	0.0	2.0	62	93	31	50%	3.5
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Bradley Stoke Way (West)	72	2	0	50	0	0	2.8	2.0	0.0	74	50	-24	32%	3.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Pear Tree Road	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Bradley Stoke Way (East)	97	0	0	65	0	0	3.6	0.0	0.0	97	65	-32	33%	3.6
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Brook Way	74	1	5	50	0	4	3.0	1.4	0.5	80	54	-26	33%	3.2
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Bradley Stoke Way (West)	134	0	2	147	1	0	1.1	1.4	2.0	136	148	12	9%	1.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Pear Tree Road	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Bowsland Way	1	0	0	0	0	0	1.4	0.0	0.0	1	0	-1	100%	1.4
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Brook Way	21	0	0	16	0	0	1.2	0.0	0.0	21	16	-5	24%	1.2
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Bradley Stoke Way (West)	225	5	1	213	3	0	0.8	1.0	1.4	231	216	-15	6%	1.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Pear Tree Road	71	0	1	79	0	0	0.9	0.0	1.4	72	79	7	10%	0.8
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Bowsland Way	19	0	0	7	0	0	3.3	0.0	0.0	19	7	-12	63%	3.3
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Bradley Stoke Way (East)	2	1	0	0	0	0	2.0	1.4	0.0	3	0	-3	100%	2.4
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Bradley Stoke Way (West)	275	2	6	268	0	6	0.4	2.0	0.0	283	274	-9	3%	0.5
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Pear Tree Road	118	0	0	91	0	0	2.6	0.0	0.0	118	91	-27	23%	2.6
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Bowsland Way	40	0	4	55	0	4	2.2	0.0	0.0	44	59	15	34%	2.1
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Bradley Stoke Way (East)	18	0	0	16	0	0	0.5	0.0	0.0	18	16	-2	11%	0.5
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Brook Way	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Pear Tree Road	55	0	0	31	0	1	3.7	0.0	1.4	55	32	-23	42%	3.5
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Bowsland Way	25	0	0	3	0	0	5.9	0.0	0.0	25	3	-22	88%	5.9
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Bradley Stoke Way (East)	222	4	2	226	1	0	0.3	1.9	2.0	228	227	-1	0%	0.1
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Brook Way	99	2	2	89	0	1	1.0	2.0	0.8	103	90	-13	13%	1.3
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Bradley Stoke Way (West)	3	1	0	0	0	0	2.4	1.4	0.0	4	0	-4	100%	2.8
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (East)	Hortham Lane	36	0	1	41	0	0	0.8	0.0	1.4	37	41	4	11%	0.6
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (East)	A38 Gloucester Road (West)	819	40	10	815	53	11	0.1	1.9	0.3	869	879	10	1%	0.3
Site 4	A38 Gloucester Road / Hortham Lane	Hortham Lane	A38 Gloucester Road (West)	204	1	1	192	0	0	0.9	1.4	1.4	206	192	-14	7%	1.0
Site 4	A38 Gloucester Road / Hortham Lane	Hortham Lane	A38 Gloucester Road (East)	84	0	2	87	0	0	0.3	0.0	2.0	86	87	1	1%	0.1
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (West)	A38 Gloucester Road (East)	809	27	13	826	23	17	0.6	0.8	1.0	849	866	17	2%	0.6
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (West)	Hortham Lane	71	3	1	70	0	0	0.1	2.4	1.4	75	70	-5	7%	0.6
Site 5	Bradley Stoke Way / Woodlands Lane	Woodlands Lane	Bradley Stoke Way (East)	20	1	0	27	0	0	1.4	1.4	0.0	21	27	6	29%	1.2
Site 5	Bradley Stoke Way / Woodlands Lane	Woodlands Lane	Bradley Stoke Way (West)	383	8	5	409	3	3	1.3	2.1	1.0	396	415	19	5%	0.9
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (East)	Bradley Stoke Way (West)	741	10	9	724	4	6	0.6	2.3	1.1	760	734	-26	3%	1.0
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (East)	Woodlands Lane	18	0	0	43	1	0	4.5	1.4	0.0	18	44	26	144%	4.7
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (West)	Woodlands Lane	914	11	8	903	22	4	0.4	2.7	1.6	933	929	-4	0%	0.1
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (West)	Bradley Stoke Way (East)	375	6	4	365	1	2	0.5	2.7	1.2	385	368	-17	4%	0.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Pear Tree Road	75	0	0	15	0	0	8.9	0.0	0.0	75	15	-60	80%	8.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Woodlands Lane (West)	286	7	5	344	2	4	3.3	2.4	0.5	298	350	52	17%	2.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Great Park Road	164	1	0	201	0	0	2.7	1.4	0.0	165	201	36	22%	2.7
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Woodlands Lane (East)	1	0	0	0	0	0	1.4	0.0	0.0	1	0	-1	100%	1.4
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Woodlands Lane (West)	52	0	0	39	1	0	1.9	1.4	0.0	52	40	-12	23%	1.8
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Great Park Road	85	0	1	76	0	0	1.0	0.0	1.4	86	76	-10	12%	1.1
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Woodlands Lane (East)	84	0	0	96	0	1	1.3	0.0	1.4	84	97	13	15%	1.4
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Pear Tree Road	2	0	0	0	0	0	2.0	0.0	0.0	2	0	-2	100%	2.0
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Great Park Road	418	0	0	442	0	0	1.2	0.0	0.0	418	442	24	6%	1.2
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Woodlands Lane (East)	316	7	7	267	15	4	2.9	2.4	1.3	330	286	-44	13%	2.5
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Pear Tree Road	15	2	1	36	1	0	4.2	0.8	1.4	18	37	19	106%	3.6
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Woodlands Lane (West)	0	1	0	0	0	0	0.0	1.4	0.0	1	0	-1	100%	1.4
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Woodlands Lane (East)	10	0	0	3	0	0	2.7	0.0	0.0	10	3	-7	70%	2.7
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Pear Tree Road	27	0	1	52	0	0	4.0	0.0	1.4	28	52	24	86%	3.8
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Woodlands Lane (West)	25	1	0	25	0	0	0.0	1.4	0.0	26	25	-1	4%	0.2
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Great Park Road	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane East	Foxfield Avenue	4	0	0	0	0	0	2.8	0.0	0.0	4	0	-4	100%	2.8
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane East	Woodlands Lane West	662	9	5	643	2	4	0.7	3.0	0.5	676	649	-27	4%	1.0
Site 7	Woodlands Lane / Foxfield Avenue	Foxfield Avenue	Woodlands Lane West	34	0	0	43	0	0	1.5	0.0	0.0	34	43	9	26%	1.5
Site 7	Woodlands Lane / Foxfield Avenue	Foxfield Avenue	Woodlands Lane East	6	0	0	14	0	0	2.5	0.0	0.0	6	14	8	133%	2.5
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane West	Woodlands Lane East	161	5	7	138	9	5	1.9	1.5	0.8	173	152	-21	12%	1.6
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane West	Foxfield Avenue	4	0	0	8	0	0	1.6	0.0	0.0	4	8	4	100%	1.6
Site 8	Foxfield Avenue / Bowsland Way	Foxfield Avenue	Bowsland Way (East)	9	0	0	6	0	0	1.1	0.0	0.0	9	6	-3	33%	1.1
Site 8	Foxfield Avenue / Bowsland Way	Foxfield Avenue	Bowsland Way (West)	17	0	0	17	0	0	0.0	0.0	0.0	17	17	0	0%	0.0
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (East)	Bowsland Way (West)	253	1	7	243	1	4	0.6	0.0	1.3	261	248	-13	5%	0.8
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (East)	Foxfield Avenue	9	0	0	0	0	0	4.2	0.0	0.0	9	0	-9	100%	4.2
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (West)	Foxfield Avenue	21	0	0	22	0	0	0.2	0.0	0.0	21	22	1	5%	0.2
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (West)	Bowsland Way (East)	88	0	4	61	0	4	3.1	0.0	0.0	92	65	-27	29%	3.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Ormonds Close	13	0	0	11	0	0	0.6	0.0	0.0	13	11	-2	15%	0.6
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Ellicks Close	25	0	0	24	0	0	0.2	0.0	0.0	25	24	-1	4%	0.2
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Bowsland Way	49	1	7	89	1	5	4.8	0.0	0.8	57	95	38	67%	4.4
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Trench Lane	1	0	0	0	0	0	1.4	0.0	0.0	1	0	-1	100%	1.4
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Ellicks Close	5	0	0	5	0	0	0.0	0.0	0.0	5	5	0	0%	0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Bowsland Way	69	0	0	48	0	0	2.7	0.0	0.0	69	48	-21	30%	2.7
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Trench Lane	35	0	0	59	0	0	3.5	0.0	0.0	35	59	24	69%	3.5
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Ormonds Close	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Bowsland Way	34	0	0	22	0	0	2.3	0.0	0.0	34	22	-12	35%	2.3
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Trench Lane	38	0	0	54	0	0	2.4	0.0	0.0	38	54	16	42%	2.4
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Ormonds Close	2	0	0	2	0	0	0.0	0.0	0.0	2	2	0	0%	0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Ellicks Close	1	0	0	1	0	0	0.0	0.0	0.0	1	1	0	0%	0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Trench Lane	46	0	4	56	0	4	1.4	0.0	0.0	50	60	10	20%	1.3
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Ormonds Close	12	0	0	7	0	0	1.6	0.0	0.0	12	7	-5	42%	1.6
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Ellicks Close	25	0	0	17	0	0	1.7	0.0	0.0	25	17	-8	32%	1.7
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Bowsland Way	9	0	0	0	0	0	4.2	0.0	0.0	9	0	-9	100%	4.2
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Trench Lane (South)	62	1	0	114	1	0	5.5	0.0	0.0	63	115	52	83%	5.5
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Trench Lane (North)	577	9	1	529	3	0	2.0	2.4	1.4	587	532	-55	9%	2.3
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Trench Lane (East)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Trench Lane (North)	48	0	4	67	0	4	2.5	0.0	0.0	52	71	19	37%	2.4
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Trench Lane (East)	72	0	0	104	0	0	3.4	0.0	0.0	72	104	32	44%	3.4
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Trench Lane (South)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Trench Lane (East)	82	5	0	96	8	0	1.5	1.2	0.0	87	104	17	20%	1.7
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Trench Lane (South)	26	0	7	11	0	5	3.5	0.0	0.8	33	16	-17	52%	3.4
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Trench Lane (North)	2	0	0	0	0	0	2.0	0.0	0.0	2	0	-2	100%	2.0

	122	
	118	
GEH<5	96.7%	
<1	51	41.8%
<2	80	65.6%
<3	102	83.6%
<4	113	92.6%
<5	118	96.7%
<6	121	99.2%
<7	121	99.2%
<8	121	99.2%

Junction No.	Junction Description	From Arm	To Arm	17:00-18:00									17:00-18:00				
				Observed			Modelled			GEH			TOTAL VEHICLES SUMMARY				
				Lights	Heavies	Buses	Lights	Heavies	Buses	Lights	Heavies	Buses	Observed	Modelled	Difference	%	GEH
Site 1	M5 East / A38 Gloucester	M5 (East)	A38 Gloucester Road (South)	733	11	2	778	8	0	1.6	1.0	2.0	746	786	40	5%	1.4
Site 1	M5 East / A38 Gloucester	M5 (East)	M5 (West)	6	0	0	0	0	0	3.5	0.0	0.0	6	0	-6	100%	3.5
Site 1	M5 East / A38 Gloucester	M5 (East)	A38 Gloucester Road (North)	297	4	0	292	2	0	0.3	1.2	0.0	301	294	-7	2%	0.4
Site 1	M5 East / A38 Gloucester	M5 (East)	M5 (East)	2	1	0	1	1	0	0.8	0.0	0.0	3	2	-1	33%	0.6
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	M5 (West)	691	3	0	719	7	0	1.1	1.8	0.0	694	726	32	5%	1.2
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	A38 Gloucester Road (North)	519	0	4	530	1	3	0.5	1.4	0.5	523	534	11	2%	0.5
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	M5 (East)	1254	15	2	1350	5	0	2.7	3.2	2.0	1271	1355	84	7%	2.3
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	A38 Gloucester Road (South)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 1	M5 East / A38 Gloucester	M5 (West)	A38 Gloucester Road (North)	543	14	0	562	8	0	0.8	1.8	0.0	557	570	13	2%	0.5
Site 1	M5 East / A38 Gloucester	M5 (West)	M5 (East)	16	1	0	0	0	0	5.7	1.4	0.0	17	0	-17	100%	5.8
Site 1	M5 East / A38 Gloucester	M5 (West)	A38 Gloucester Road (South)	555	5	1	607	7	0	2.2	0.8	1.4	561	614	53	9%	2.2
Site 1	M5 East / A38 Gloucester	M5 (West)	M5 (West)	3	1	0	0	0	0	2.4	1.4	0.0	4	0	-4	100%	2.8
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	M5 (East)	248	4	0	269	3	0	1.3	0.5	0.0	252	272	20	8%	1.2
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	A38 Gloucester Road (South)	423	2	6	399	2	3	1.2	0.0	1.4	431	404	-27	6%	1.3
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	M5 (West)	344	8	0	383	9	0	2.0	0.3	0.0	352	392	40	11%	2.1
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	A38 Gloucester Road (North)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	A38 Gloucester Road (South)	411	1	6	386	0	3	1.3	1.4	1.4	418	389	-29	7%	1.4
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	Park Avenue	56	0	1	52	0	0	0.5	0.0	1.4	57	52	-5	9%	0.7
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	A38 Gloucester Road (North)	845	5	1	803	3	1	1.5	1.0	0.0	851	807	-44	5%	1.5
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	Bradley Stoke Way	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	Park Avenue	37	0	0	42	0	0	0.8	0.0	0.0	37	42	5	14%	0.8
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	A38 Gloucester Road (North)	633	12	4	696	11	2	2.4	0.3	1.2	649	709	60	9%	2.3
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	Bradley Stoke Way	241	1	3	231	0	5	0.7	1.4	1.0	245	236	-9	4%	0.6
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	A38 Gloucester Road (South)	48	0	0	49	0	0	0.1	0.0	0.0	48	49	1	2%	0.1
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	A38 Gloucester Road (North)	985	1	1	1063	0	0	2.4	1.4	1.4	987	1063	76	8%	2.4
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	Bradley Stoke Way	240	1	0	250	0	0	0.6	1.4	0.0	241	250	9	4%	0.6
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	A38 Gloucester Road (South)	268	0	6	272	0	0	0.2	0.0	3.5	274	272	-2	1%	0.1
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	Park Avenue	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	Bradley Stoke Way	879	1	2	912	4	1	1.1	1.9	0.8	882	917	35	4%	1.2
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	A38 Gloucester Road (South)	766	13	3	771	13	2	0.2	0.0	0.6	782	786	4	1%	0.1
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	Park Avenue	69	4	4	83	0	0	1.6	2.8	2.8	77	83	6	8%	0.7
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	A38 Gloucester Road (North)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Bowsland Way	11	0	0	0	0	0	4.7	0.0	0.0	11	0	-11	100%	4.7
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Bradley Stoke Way (East)	92	1	0	67	0	0	2.8	1.4	0.0	93	67	-26	28%	2.9
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Brook Way	99	0	2	68	0	0	3.4	0.0	2.0	101	68	-33	33%	3.6
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Bradley Stoke Way (West)	106	0	0	113	0	0	0.7	0.0	0.0	106	113	7	7%	0.7
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Pear Tree Road	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Bradley Stoke Way (East)	81	0	0	51	0	0	3.7	0.0	0.0	81	51	-30	37%	3.7
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Brook Way	60	0	4	45	0	4	2.1	0.0	0.0	64	49	-15	23%	2.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Bradley Stoke Way (West)	69	0	0	50	0	0	2.5	0.0	0.0	69	50	-19	28%	2.5
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Pear Tree Road	5	0	0	0	0	0	3.2	0.0	0.0	5	0	-5	100%	3.2
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Bowsland Way	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Brook Way	50	0	0	55	0	0	0.7	0.0	0.0	50	55	5	10%	0.7
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Bradley Stoke Way (West)	277	1	2	294	0	0	1.0	1.4	2.0	280	294	14	5%	0.8
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Pear Tree Road	55	0	0	50	0	0	0.7	0.0	0.0	55	50	-5	9%	0.7
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Bowsland Way	75	0	0	57	0	0	2.2	0.0	0.0	75	57	-18	24%	2.2
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Bradley Stoke Way (East)	1	0	0	0	0	0	1.4	0.0	0.0	1	0	-1	100%	1.4
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Bradley Stoke Way (West)	227	1	1	240	0	1	0.9	1.4	0.0	229	241	12	5%	0.8
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Pear Tree Road	90	0	2	76	0	0	1.5	0.0	2.0	92	76	-16	17%	1.7
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Bowsland Way	89	1	4	77	0	4	1.3	1.4	0.0	94	81	-13	14%	1.4
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Bradley Stoke Way (East)	41	0	0	45	0	0	0.6	0.0	0.0	41	45	4	10%	0.6
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Brook Way	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Pear Tree Road	57	0	0	39	1	1	2.6	1.4	1.4	57	41	-16	28%	2.3
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Bowsland Way	99	0	0	82	0	0	1.8	0.0	0.0	99	82	-17	17%	1.8
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Bradley Stoke Way (East)	476	0	0	546	2	0	3.1	2.0	0.0	476	548	72	15%	3.2
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Brook Way	300	0	1	332	0	1	1.8	0.0	0.0	301	333	32	11%	1.8
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Bradley Stoke Way (West)	1	0	0	0	0	0	1.4	0.0	0.0	1	0	-1	100%	1.4
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (East)	Hortham Lane	54	0	0	59	0	0	0.7	0.0	0.0	54	59	5	9%	0.7
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (East)	A38 Gloucester Road (West)	818	14	5	855	15	3	1.3	0.3	1.0	837	873	36	4%	1.2
Site 4	A38 Gloucester Road / Hortham Lane	Hortham Lane	A38 Gloucester Road (West)	100	0	1	95	0	0	0.5	0.0	1.4	101	95	-6	6%	0.6
Site 4	A38 Gloucester Road / Hortham Lane	Hortham Lane	A38 Gloucester Road (East)	37	0	1	38	0	0	0.2	0.0	1.4	38	38	0	0%	0.0
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (West)	A38 Gloucester Road (East)	1109	18	3	1135	11	4	0.8	1.8	0.5	1130	1150	20	2%	0.6
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (West)	Hortham Lane	156	0	1	170	0	0	1.1	0.0	1.4	157	170	13	8%	1.0
Site 5	Bradley Stoke Way / Woodlands Lane	Woodlands Lane	Bradley Stoke Way (East)	33	0	0	55	0	0	3.3	0.0	0.0	33	55	22	67%	3.3
Site 5	Bradley Stoke Way / Woodlands Lane	Woodlands Lane	Bradley Stoke Way (West)	644	4	5	548	1	3	3.9	1.9	1.0	653	552	-101	15%	4.1
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (East)	Bradley Stoke Way (West)	668	2	3	688	1	1	0.8	0.8	1.4	673	690	17	3%	0.7
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (East)	Woodlands Lane	15	0	0	12	0	0	0.8	0.0	0.0	15	12	-3	20%	0.8
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (West)	Woodlands Lane	460	3	4	462	1	4	0.1	1.4	0.0	467	467	0	0%	0.0
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (West)	Bradley Stoke Way (East)	900	0	1	936	3	2	1.2	2.4	0.8	901	941	40	4%	1.3
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Pear Tree Road	94	1	0	74	0	0	2.2	1.4	0.0	95	74	-21	22%	2.3
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Woodlands Lane (West)	203	3	5	203	0	4	0.0	2.4	0.5	211	207	-4	2%	0.3
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Great Park Road	4	0	0	0	0	0	2.8	0.0	0.0	4	0	-4	100%	2.8
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Woodlands Lane (East)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Woodlands Lane (West)	27	0	0	6	1	0	5.2	1.4	0.0	27	7	-20	74%	4.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Great Park Road	15	0	2	12	0	0	0.8	0.0	2.0	17	12	-5	29%	1.3
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Woodlands Lane (East)	71	0	0	59	0	1	1.5	0.0	1.4	71	60	-11	15%	1.4
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Pear Tree Road	2	0	0	0	0	0	2.0	0.0	0.0	2	0	-2	100%	2.0
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Great Park Road	33	0	0	33	0	0	0.0	0.0	0.0	33	33	0	0%	0.0
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Woodlands Lane (East)	347	3	4	338	0	4	0.5	2.4	0.0	354	342	-12	3%	0.6
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Pear Tree Road	75	0	0	69	0	0	0.7	0.0	0.0	75	69	-6	8%	0.7
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Woodlands Lane (West)	2	0	0	0	0	0	2.0	0.0	0.0	2	0	-2	100%	2.0
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Woodlands Lane (East)	116	0	0	123	0	0	0.6	0.0	0.0	116	123	7	6%	0.6
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Pear Tree Road	131	0	2	141	0	0	0.9	0.0	2.0	133	141	8	6%	0.7
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Woodlands Lane (West)	254	0	0	198	0	0	3.7	0.0	0.0	254	198	-56	22%	3.7
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Great Park Road	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane East	Foxfield Avenue	11	0	0	0	0	0	4.7	0.0	0.0	11	0	-11	100%	4.7
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane East	Woodlands Lane West	140	3	5	120	4	4	1.8	0.5	0.5	148	128	-20	14%	1.7
Site 7	Woodlands Lane / Foxfield Avenue	Foxfield Avenue	Woodlands Lane West	6	0	0	10	0	0	1.4	0.0	0.0	6	10	4	67%	1.4
Site 7	Woodlands Lane / Foxfield Avenue	Foxfield Avenue	Woodlands Lane East	1	0	0	11	0	0	4.1	0.0	0.0	1	11	10	1000%	4.1
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane West	Woodlands Lane East	621	4	4	581	4	5	1.6	0.0	0.5	629	590	-39	6%	1.6
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane West	Foxfield Avenue	40	0	0	32	0	0	1.3	0.0	0.0	40	32	-8	20%	1.3
Site 8	Foxfield Avenue / Bowsland Way	Foxfield Avenue	Bowsland Way (East)	8	0	0	3	0	0	2.1	0.0	0.0	8	3	-5	63%	2.1
Site 8	Foxfield Avenue / Bowsland Way	Foxfield Avenue	Bowsland Way (West)	33	0	0	14	0	0	3.9	0.0	0.0	33	14	-19	58%	3.9
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (East)	Bowsland Way (West)	172	0	4	129	1	4	3.5	1.4	0.0	176	134	-42	24%	3.4
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (East)	Foxfield Avenue	6	0	0	0	0	0	3.5	0.0	0.0	6	0	-6	100%	3.5
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (West)	Foxfield Avenue	26	0	0	23	0	0	0.6	0.0	0.0	26	23	-3	12%	0.6
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (West)	Bowsland Way (East)	237	1	5	192	0	4	3.1	1.4	0.5	243	196	-47	19%	3.2
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Ormonds Close	44	0	0	70	0	0	3.4	0.0	0.0	44	70	26	59%	3.4
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Ellicks Close	42	0	0	50	0	0	1.2	0.0	0.0	42	50	8	19%	1.2
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Bowsland Way	63	0	4	60	1	4	0.4	1.4	0.0	67	65	-2	3%	0.2
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Trench Lane	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Ellicks Close	3	0	0	3	0	0	0.0	0.0	0.0	3	3	0	0%	0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Bowsland Way	32	0	0	24	0	0	1.5	0.0	0.0	32	24	-8	25%	1.5
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Trench Lane	15	0	0	29	0	0	3.0	0.0	0.0	15	29	14	93%	3.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Ormonds Close	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Bowsland Way	34	0	0	23	0	0	2.1	0.0	0.0	34	23	-11	32%	2.1
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Trench Lane	17	0	0	37	0	0	3.8	0.0	0.0	17	37	20	118%	3.8
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Ormonds Close	1	0	0	1	0	0	0.0	0.0	0.0	1	1	0	0%	0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Ellicks Close	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Trench Lane	48	0	5	15	0	4	5.9	0.0	0.5	53	19	-34	64%	5.7
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Ormonds Close	51	0	0	40	0	0	1.6	0.0	0.0	51	40	-11	22%	1.6
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Ellicks Close	26	0	0	23	0	0	0.6	0.0	0.0	26	23	-3	12%	0.6
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Bowsland Way	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Trench Lane (South)	89	0	0	73	0	0	1.8	0.0	0.0	89	73	-16	18%	1.8
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Trench Lane (North)	89	3	0	77	4	0	1.3	0.5	0.0	92	81	-11	12%	1.2
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Trench Lane (East)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Trench Lane (North)	20	0	5	14	0	4	1.5	0.0	0.5	25	18	-7	28%	1.5
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Trench Lane (East)	60	0	0	67	0	0	0.9	0.0	0.0	60	67	7	12%	0.9
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Trench Lane (South)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Trench Lane (East)	510	4	0	463	4	0	2.1	0.0	0.0	514	467	-47	9%	2.1
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Trench Lane (South)	60	0	4	109	0	5	5.3	0.0	0.5	64	114	50	78%	5.3
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Trench Lane (North)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0

	122	
	119	
GEH<5	97.5%	
<1	55	45.1%
<2	85	69.7%
<3	101	82.8%
<4	114	93.4%
<5	119	97.5%
<6	122	100.0%
<7	122	100.0%
<8	122	100.0%

Junction No.	Junction Description	From Arm	Approach / Exit	08:00-09:00									08:00-09:00				
				Observed			Modelled			GEH			TOTAL VEHICLES SUMMARY				
				Lights	Heavies	Buses	Lights	Heavies	Buses	Lights	Heavies	Buses	Observed	Modelled	Difference	%	GEH
Site 1	M5 East / A38 Gloucester	M5 (East)	Approach	2031	43	3	1963	41	0	1.5	0.3	2.4	2077	2004	-73	4%	1.6
Site 1	M5 East / A38 Gloucester	M5 (East)	Exit	652	33	4	645	29	0	0.3	0.7	2.8	689	674	-15	2%	0.6
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	Approach	1130	36	21	1185	32	16	1.6	0.7	1.2	1187	1233	46	4%	1.3
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	Exit	3175	47	14	3020	66	11	2.8	2.5	0.8	3236	3097	-139	4%	2.5
Site 1	M5 East / A38 Gloucester	M5 (West)	Approach	1165	26	0	1093	29	0	2.1	0.6	0.0	1191	1122	-69	6%	2.0
Site 1	M5 East / A38 Gloucester	M5 (West)	Exit	674	36	3	672	33	0	0.1	0.5	2.4	713	705	-8	1%	0.3
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	Approach	1079	41	11	1010	50	11	2.1	1.3	0.0	1131	1071	-60	5%	1.8
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	Exit	904	30	14	914	24	16	0.3	1.2	0.5	948	954	6	1%	0.2
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	Approach	1124	18	14	1142	6	9	0.5	3.5	1.5	1156	1157	1	0%	0.0
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	Exit	1289	17	12	1262	23	6	0.8	1.3	2.0	1318	1291	-27	2%	0.7
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	Approach	1164	21	21	1125	21	15	1.2	0.0	1.4	1206	1161	-45	4%	1.3
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	Exit	1240	35	15	1141	34	12	2.9	0.2	0.8	1290	1187	-103	8%	2.9
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	Approach	218	7	8	208	8	0	0.7	0.4	4.0	233	216	-17	7%	1.1
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	Exit	2027	5	9	1877	8	0	3.4	1.2	4.2	2041	1885	-156	8%	3.5
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	Approach	3177	47	14	2986	62	10	3.4	2.0	1.2	3238	3058	-180	6%	3.2
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	Exit	1127	36	21	1181	32	16	1.6	0.7	1.2	1184	1229	45	4%	1.3
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Approach	194	2	2	251	0	0	3.8	2.0	2.0	198	251	53	27%	3.5
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Exit	244	0	1	201	0	1	2.9	0.0	0.0	245	202	-43	18%	2.9
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Approach	306	1	7	262	1	4	2.6	0.0	1.3	314	267	-47	15%	2.8
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Exit	92	0	4	80	0	4	1.3	0.0	0.0	96	84	-12	13%	1.3
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Approach	338	6	2	315	3	0	1.3	1.4	2.0	346	318	-28	8%	1.5
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Exit	394	5	2	400	1	0	0.3	2.3	2.0	401	401	0	0%	0.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Approach	451	2	10	430	0	10	1.0	2.0	0.0	463	440	-23	5%	1.1
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Exit	254	3	9	248	0	5	0.4	2.4	1.5	266	253	-13	5%	0.8
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Approach	404	7	4	349	1	2	2.8	3.0	1.2	415	352	-63	15%	3.2
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Exit	709	10	9	678	4	6	1.2	2.3	1.1	728	688	-40	5%	1.5
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (East)	Approach	855	40	11	856	53	11	0.0	1.9	0.0	906	920	14	2%	0.5
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (East)	Exit	893	27	15	913	23	17	0.7	0.8	0.5	935	953	18	2%	0.6
Site 4	A38 Gloucester Road / Hortham Lane	Hortham Lane	Approach	288	1	3	279	0	0	0.5	1.4	2.4	292	279	-13	4%	0.8
Site 4	A38 Gloucester Road / Hortham Lane	Hortham Lane	Exit	107	3	2	111	0	0	0.4	2.4	2.0	112	111	-1	1%	0.1
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (West)	Approach	880	30	14	896	23	17	0.5	1.4	0.8	924	936	12	1%	0.4
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (West)	Exit	1023	41	11	1007	53	11	0.5	1.8	0.0	1075	1071	-4	0%	0.1
Site 5	Bradley Stoke Way / Woodlands Lane	Woodlands Lane	Approach	403	9	5	436	3	3	1.6	2.4	1.0	417	442	25	6%	1.2
Site 5	Bradley Stoke Way / Woodlands Lane	Woodlands Lane	Exit	932	11	8	946	23	4	0.5	2.9	1.6	951	973	22	2%	0.7
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (East)	Approach	759	10	9	767	5	6	0.3	1.8	1.1	778	778	0	0%	0.0
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (East)	Exit	395	7	4	392	1	2	0.2	3.0	1.2	406	395	-11	3%	0.5
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (West)	Approach	1289	17	12	1268	23	6	0.6	1.3	2.0	1318	1297	-21	2%	0.6
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (West)	Exit	1124	18	14	1133	7	9	0.3	3.1	1.5	1156	1149	-7	1%	0.2
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Approach	526	8	5	560	2	4	1.5	2.7	0.5	539	566	27	5%	1.1
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Exit	411	7	7	366	15	5	2.3	2.4	0.8	425	386	-39	9%	1.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Approach	223	0	1	211	1	1	0.8	1.4	0.0	224	213	-11	5%	0.7
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Exit	119	2	2	103	1	0	1.5	0.8	2.0	123	104	-19	15%	1.8
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Approach	749	10	8	745	16	4	0.1	1.7	1.6	767	765	-2	0%	0.1
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Exit	363	9	5	408	3	4	2.3	2.4	0.5	377	415	38	10%	1.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Approach	62	1	1	80	0	0	2.1	1.4	1.4	64	80	16	25%	1.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Exit	667	1	1	719	0	0	2.0	1.4	1.4	669	719	50	7%	1.9
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane East	Approach	666	9	5	643	2	4	0.9	3.0	0.5	680	649	-31	5%	1.2
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane East	Exit	167	5	7	152	9	5	1.2	1.5	0.8	179	166	-13	7%	1.0
Site 7	Woodlands Lane / Foxfield Avenue	Foxfield Avenue	Approach	40	0	0	57	0	0	2.4	0.0	0.0	40	57	17	43%	2.4
Site 7	Woodlands Lane / Foxfield Avenue	Foxfield Avenue	Exit	8	0	0	8	0	0	0.0	0.0	0.0	8	8	0	0%	0.0
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane West	Approach	165	5	7	146	9	5	1.5	1.5	0.8	177	160	-17	10%	1.3
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane West	Exit	696	9	5	686	2	4	0.4	3.0	0.5	710	692	-18	3%	0.7
Site 8	Foxfield Avenue / Bowsland Way	Foxfield Avenue	Approach	26	0	0	23	0	0	0.6	0.0	0.0	26	23	-3	12%	0.6
Site 8	Foxfield Avenue / Bowsland Way	Foxfield Avenue	Exit	30	0	0	22	0	0	1.6	0.0	0.0	30	22	-8	27%	1.6
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (East)	Approach	262	1	7	243	1	4	1.2	0.0	1.3	270	248	-22	8%	1.4
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (East)	Exit	97	0	4	67	0	4	3.3	0.0	0.0	101	71	-30	30%	3.2
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (West)	Approach	109	0	4	83	0	4	2.7	0.0	0.0	113	87	-26	23%	2.6
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (West)	Exit	270	1	7	260	1	4	0.6	0.0	1.3	278	265	-13	5%	0.8
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Approach	88	1	7	124	1	5	3.5	0.0	0.8	96	130	34	35%	3.2
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Exit	120	0	4	169	0	4	4.1	0.0	0.0	124	173	49	40%	4.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Approach	109	0	0	112	0	0	0.3	0.0	0.0	109	112	3	3%	0.3
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Exit	27	0	0	20	0	0	1.4	0.0	0.0	27	20	-7	26%	1.4
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Approach	75	0	0	79	0	0	0.5	0.0	0.0	75	79	4	5%	0.5
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Exit	56	0	0	47	0	0	1.3	0.0	0.0	56	47	-9	16%	1.3
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Approach	92	0	4	80	0	4	1.3	0.0	0.0	96	84	-12	13%	1.3
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Exit	161	1	7	159	1	5	0.2	0.0	0.8	169	165	-4	2%	0.3
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Approach	639	10	1	643	4	0	0.2	2.3	1.4	650	647	-3	0%	0.1
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Exit	154	5	0	200	8	0	3.5	1.2	0.0	159	208	49	31%	3.6
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Approach	120	0	4	171	0	4	4.2	0.0	0.0	124	175	51	41%	4.2
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Exit	88	1	7	125	1	5	3.6	0.0	0.8	96	131	35	36%	3.3
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Approach	110	5	7	107	8	5	0.3	1.2	0.8	122	120	-2	2%	0.2
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Exit	627	9	5	596	3	4	1.3	2.4	0.5	641	603	-38	6%	1.5

	72	
	72	
GEH<5	**100.0%**	
<1	30	41.7%
<2	56	77.8%
<3	62	86.1%
<4	71	98.6%
<5	72	100.0%
<6	72	100.0%
<7	72	100.0%
<8	72	100.0%
<700vehs	within 100	
pass	47	100.0%
fail	0	0.0%
700-2700	<15%	
pass	23	100.0%
fail	0	0.0%
>2700vehs	within 400	
pass	2	100.0%
fail	0	0.0%

Junction No.	Junction Description	From Arm	Approach / Exit	17:00-18:00									17:00-18:00				
				Observed			Modelled			GEH			TOTAL VEHICLES SUMMARY				
				Lights	Heavies	Buses	Lights	Heavies	Buses	Lights	Heavies	Buses	Observed	Modelled	Difference	%	GEH
Site 1	M5 East / A38 Gloucester	M5 (East)	Approach	1038	16	2	1071	11	0	1.0	1.4	2.0	1056	1082	26	2%	0.8
Site 1	M5 East / A38 Gloucester	M5 (East)	Exit	1520	21	2	1620	9	0	2.5	3.1	2.0	1543	1629	86	6%	2.2
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	Approach	2464	18	6	2599	13	3	2.7	1.3	1.4	2488	2615	127	5%	2.5
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	Exit	1711	18	9	1784	17	3	1.7	0.2	2.4	1738	1804	66	4%	1.6
Site 1	M5 East / A38 Gloucester	M5 (West)	Approach	1117	21	1	1169	15	0	1.5	1.4	1.4	1139	1184	45	4%	1.3
Site 1	M5 East / A38 Gloucester	M5 (West)	Exit	1044	12	0	1102	16	0	1.8	1.1	0.0	1056	1118	62	6%	1.9
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	Approach	1015	14	6	1051	14	3	1.1	0.0	1.4	1035	1068	33	3%	1.0
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	Exit	1359	18	4	1384	11	3	0.7	1.8	0.5	1381	1398	17	1%	0.5
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	Approach	1312	6	8	1241	3	4	2.0	1.4	1.6	1326	1248	-78	6%	2.2
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	Exit	1360	3	5	1393	4	6	0.9	0.5	0.4	1368	1403	35	3%	0.9
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	Approach	959	13	7	1018	11	7	1.9	0.6	0.0	979	1036	57	6%	1.8
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	Exit	1493	14	15	1478	13	5	0.4	0.3	3.2	1522	1496	-26	2%	0.7
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	Approach	1493	2	7	1585	0	0	2.3	2.0	3.7	1502	1585	83	6%	2.1
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	Exit	162	4	5	177	0	0	1.2	2.8	3.2	171	177	6	4%	0.5
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	Approach	1714	18	9	1766	17	3	1.2	0.2	2.4	1741	1786	45	3%	1.1
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	Exit	2463	18	6	2562	14	3	2.0	1.0	1.4	2487	2579	92	4%	1.8
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Approach	308	1	2	248	0	0	3.6	1.4	2.0	311	248	-63	20%	3.8
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Exit	207	0	2	165	1	1	3.1	1.4	0.8	209	167	-42	20%	3.1
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Approach	215	0	4	146	0	4	5.1	0.0	0.0	219	150	-69	32%	5.1
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Exit	274	1	4	216	0	4	3.7	1.4	0.0	279	220	-59	21%	3.7
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Approach	458	1	2	456	0	0	0.1	1.4	2.0	461	456	-5	1%	0.2
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Exit	691	1	0	709	2	0	0.7	0.8	0.0	692	711	19	3%	0.7
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Approach	447	2	7	438	0	5	0.4	2.0	0.8	456	443	-13	3%	0.6
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Exit	509	0	7	500	0	5	0.4	0.0	0.8	516	505	-11	2%	0.5
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Approach	933	0	1	999	3	2	2.1	2.4	0.8	934	1004	70	7%	2.2
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Exit	680	2	3	697	0	1	0.6	2.0	1.4	685	698	13	2%	0.5
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (East)	Approach	872	14	5	914	15	3	1.4	0.3	1.0	891	932	41	5%	1.4
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (East)	Exit	1146	18	4	1173	11	4	0.8	1.8	0.0	1168	1188	20	2%	0.6
Site 4	A38 Gloucester Road / Hortham Lane	Hortham Lane	Approach	137	0	2	133	0	0	0.3	0.0	2.0	139	133	-6	4%	0.5
Site 4	A38 Gloucester Road / Hortham Lane	Hortham Lane	Exit	210	0	1	229	0	0	1.3	0.0	1.4	211	229	18	9%	1.2
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (West)	Approach	1265	18	4	1305	11	4	1.1	1.8	0.0	1287	1320	33	3%	0.9
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (West)	Exit	918	14	6	950	15	3	1.0	0.3	1.4	938	968	30	3%	1.0
Site 5	Bradley Stoke Way / Woodlands Lane	Woodlands Lane	Approach	677	4	5	603	1	3	2.9	1.9	1.0	686	607	-79	12%	3.1
Site 5	Bradley Stoke Way / Woodlands Lane	Woodlands Lane	Exit	475	3	4	474	1	4	0.0	1.4	0.0	482	479	-3	1%	0.1
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (East)	Approach	683	2	3	700	1	1	0.6	0.8	1.4	688	702	14	2%	0.5
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (East)	Exit	933	0	1	991	3	2	1.9	2.4	0.8	934	996	62	7%	2.0
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (West)	Approach	1360	3	5	1398	4	6	1.0	0.5	0.4	1368	1408	40	3%	1.1
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (West)	Exit	1312	6	8	1236	2	4	2.1	2.0	1.6	1326	1242	-84	6%	2.3
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Approach	301	4	5	277	0	4	1.4	2.8	0.5	310	281	-29	9%	1.7
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Exit	534	3	4	520	0	5	0.6	2.4	0.5	541	525	-16	3%	0.7
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Approach	115	0	2	77	1	1	3.9	1.4	0.8	117	79	-38	32%	3.8
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Exit	302	1	2	284	0	0	1.1	1.4	2.0	305	284	-21	7%	1.2
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Approach	457	3	4	440	0	4	0.8	2.4	0.0	464	444	-20	4%	0.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Exit	486	3	5	407	1	4	3.7	1.4	0.5	494	412	-82	17%	3.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Approach	501	0	2	462	0	0	1.8	0.0	2.0	503	462	-41	8%	1.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Exit	52	0	2	45	0	0	1.0	0.0	2.0	54	45	-9	17%	1.3
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane East	Approach	151	3	5	120	4	4	2.7	0.5	0.5	159	128	-31	19%	2.6
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane East	Exit	622	4	4	592	4	5	1.2	0.0	0.5	630	601	-29	5%	1.2
Site 7	Woodlands Lane / Foxfield Avenue	Foxfield Avenue	Approach	7	0	0	21	0	0	3.7	0.0	0.0	7	21	14	200%	3.7
Site 7	Woodlands Lane / Foxfield Avenue	Foxfield Avenue	Exit	51	0	0	32	0	0	2.9	0.0	0.0	51	32	-19	37%	2.9
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane West	Approach	661	4	4	613	4	5	1.9	0.0	0.5	669	622	-47	7%	1.8
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane West	Exit	146	3	5	130	4	4	1.4	0.5	0.5	154	138	-16	10%	1.3
Site 8	Foxfield Avenue / Bowsland Way	Foxfield Avenue	Approach	41	0	0	17	0	0	4.5	0.0	0.0	41	17	-24	59%	4.5
Site 8	Foxfield Avenue / Bowsland Way	Foxfield Avenue	Exit	32	0	0	23	0	0	1.7	0.0	0.0	32	23	-9	28%	1.7
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (East)	Approach	178	0	4	129	1	4	4.0	1.4	0.0	182	134	-48	26%	3.8
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (East)	Exit	245	1	5	195	0	4	3.4	1.4	0.5	251	199	-52	21%	3.5
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (West)	Approach	263	1	5	215	0	4	3.1	1.4	0.5	269	219	-50	19%	3.2
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (West)	Exit	205	0	4	143	1	4	4.7	1.4	0.0	209	148	-61	29%	4.6
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Approach	149	0	4	180	1	4	2.4	1.4	0.0	153	185	32	21%	2.5
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Exit	80	0	5	81	0	4	0.1	0.0	0.5	85	85	0	0%	0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Approach	50	0	0	56	0	0	0.8	0.0	0.0	50	56	6	12%	0.8
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Exit	96	0	0	111	0	0	1.5	0.0	0.0	96	111	15	16%	1.5
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Approach	52	0	0	61	0	0	1.2	0.0	0.0	52	61	9	17%	1.2
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Exit	71	0	0	76	0	0	0.6	0.0	0.0	71	76	5	7%	0.6
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Approach	125	0	5	78	0	4	4.7	0.0	0.5	130	82	-48	37%	4.7
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Exit	129	0	4	107	1	4	2.0	1.4	0.0	133	112	-21	16%	1.9
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Approach	178	3	0	150	4	0	2.2	0.5	0.0	181	154	-27	15%	2.1
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Exit	570	4	0	530	4	0	1.7	0.0	0.0	574	534	-40	7%	1.7
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Approach	80	0	5	81	0	4	0.1	0.0	0.5	85	85	0	0%	0.0
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Exit	149	0	4	182	0	5	2.6	0.0	0.5	153	187	34	22%	2.6
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Approach	570	4	4	572	4	5	0.1	0.0	0.5	578	581	3	1%	0.1
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Exit	109	3	5	91	4	4	1.8	0.5	0.5	117	99	-18	15%	1.7

	72	
	71	
GEH<5	**98.6%**	
<1	24	33.3%
<2	47	65.3%
<3	58	80.6%
<4	68	94.4%
<5	71	98.6%
<6	72	100.0%
<7	72	100.0%
<8	72	100.0%
<700vehs	within 100	
pass	49	100.0%
fail	0	0.0%
700-2700	<15%	
pass	23	100.0%
fail	0	0.0%
>2700vehs	within 400	
pass	0	-
fail	0	-

		08:00-09:00				
		Observed	Modelled	Difference	%	GEH
Site 1 NB	A38 Gloucester Road NB	906	951	46	5%	1.5
Site 1 SB	A38 Gloucester Road SB	912	919	8	1%	0.2
Site 2 EB	Hortham Lane EB	56	33	-23	41%	3.5
Site 2 WB	Hortham Lane WB	126	81	-45	36%	4.4
Site 3 EB	Trench Lane EB	166	207	41	25%	3.0
Site 3 WB	Trench Lane WB	635	646	11	2%	0.4
Site 4 EB	Bowsland Way EB	125	77	-48	38%	4.8
Site 4 WB	Bowsland Way WB	199	205	6	3%	0.4
Site 5 EB	Bradley Stoke Way EB	422	404	-18	4%	0.9
Site 5 WB	Bradley Stoke Way WB	390	321	-69	18%	3.6
Site 6 NB	Brook Way NB	435	441	6	1%	0.3
Site 6 SB	Brook Way SB	275	251	-24	9%	1.5

	12		
	12		
GEH<5	100.0%		
<3	8	66.7%	
<4	10	83.3%	
<5	12	100.0%	
<6	12	100.0%	
<7	12	100.0%	
<8	12	100.0%	
<9	12	100.0%	
<10	12	100.0%	
<700vehs	within 100		
pass	10	100.0%	
fail	0	0.0%	
700-2700	<15%		
pass	2	100.0%	
fail	0	0.0%	
>2700vehs	within 400		
pass	0	-	
fail	0	-	

17:00-18:00				
Observed	Modelled	Difference	%	GEH
1159	1187	28	2%	0.8
886	930	44	5%	1.5
114	75	-39	34%	4.0
66	42	-24	36%	3.2
543	534	-9	2%	0.4
205	152	-53	26%	3.9
158	136	-22	14%	1.8
142	116	-26	18%	2.3
708	708	0	0%	0.0
497	452	-45	9%	2.1
439	441	2	0%	0.1
450	503	53	12%	2.4

	12	
	12	
GEH<5	100.0%	
<3	9	75.0%
<4	12	100.0%
<5	12	100.0%
<6	12	100.0%
<7	12	100.0%
<8	12	100.0%
<9	12	100.0%
<10	12	100.0%
<700vehs	within 100	
pass	9	100.0%
fail	0	0.0%
700-2700	<15%	
pass	3	100.0%
fail	0	0.0%
>2700vehs	within 400	
pass	0	-
fail	0	-

Route	Observed	Modelled	08:00-09:00		
	08:00-09:00	08:00-09:00	Diff (s)	Diff (%)	Pass or Fail
R1 NB 1	25	24	1	-3%	PASS
R1 NB 2	17	13	4	-22%	PASS
R1 NB 3	14	14	0	-2%	PASS
R1 NB 4	23	27	4	19%	PASS
R1 NB 5	65	70	5	8%	PASS
R1 NB 6	14	30	16	113%	PASS
R1 NB 7	11	8	3	-28%	PASS
R1 NB 8	78	71	7	-9%	PASS
R1 NB 9	37	17	20	-53%	PASS
R1 NB 10	113	108	5	-5%	PASS
R1 NB 11	44	58	15	34%	PASS
R1 NB 12	46	57	11	23%	PASS
R1 NB Total	***485***	***496***	***11***	***2%***	***PASS***
R1 SB 1	71	54	17	-24%	PASS
R1 SB 2	62	57	5	-8%	PASS
R1 SB 3	149	203	54	36%	PASS
R1 SB 4	32	48	16	50%	PASS
R1 SB 5	41	77	36	88%	PASS
R1 SB 6	63	19	43	-69%	PASS
R1 SB 7	21	27	7	33%	PASS
R1 SB 8	18	16	2	-11%	PASS
R1 SB 9	4	5	1	30%	PASS
R1 SB 10	35	28	7	-20%	PASS
R1 SB Total	***494***	***534***	***39***	***8%***	***PASS***
R2 EB 1	31	78	47	150%	PASS
R2 EB 2	35	37	3	8%	PASS
R2 EB 3	23	7	16	-68%	PASS
R2 EB 4	26	38	11	43%	PASS
R2 EB 5	27	29	2	8%	PASS
R2 EB 6	33	42	9	26%	PASS
R2 EB 7	26	30	5	19%	PASS
R2 EB 8	88	97	9	10%	PASS
R2 EB 9	64	50	14	-22%	PASS
R2 EB Total	***354***	***409***	***55***	***15%***	***PASS***
R2 WB 1	64	50	13	-21%	PASS
R2 WB 2	88	113	25	28%	PASS
R2 WB 3	25	28	2	8%	PASS
R2 WB 4	53	70	17	32%	PASS
R2 WB 5	117	72	45	-39%	PASS
R2 WB 6	15	10	5	-37%	PASS
R2 WB 7	34	36	2	6%	PASS
R2 WB Total	***396***	***377***	***19***	***-5%***	***PASS***

Route	Observed	Modelled	17:00-18:00		
	17:00-18:00	17:00-18:00	Diff (s)	Diff (%)	Pass or Fail
R1 NB 1	21	30	9	43%	PASS
R1 NB 2	13	15	2	18%	PASS
R1 NB 3	11	13	2	16%	PASS
R1 NB 4	20	24	4	23%	PASS
R1 NB 5	73	40	33	-45%	PASS
R1 NB 6	13	7	6	-46%	PASS
R1 NB 7	7	28	20	270%	PASS
R1 NB 8	55	58	3	5%	PASS
R1 NB 9	11	14	3	30%	PASS
R1 NB 10	102	122	19	19%	PASS
R1 NB 11	53	66	13	24%	PASS
R1 NB 12	42	57	15	35%	PASS
R1 NB Total	***421***	***473***	***52***	***12%***	***PASS***
R1 SB 1	52	53	2	3%	PASS
R1 SB 2	46	56	10	21%	PASS
R1 SB 3	132	147	15	11%	PASS
R1 SB 4	10	18	8	76%	PASS
R1 SB 5	108	56	53	-49%	PASS
R1 SB 6	44	27	17	-38%	PASS
R1 SB 7	20	24	5	24%	PASS
R1 SB 8	15	21	6	39%	PASS
R1 SB 9	4	7	3	66%	PASS
R1 SB 10	28	29	1	5%	PASS
R1 SB Total	***458***	***437***	***21***	***-5%***	***PASS***
R2 EB 1	48	38	10	-22%	PASS
R2 EB 2	18	33	15	87%	PASS
R2 EB 3	11	7	3	-31%	PASS
R2 EB 4	29	32	3	10%	PASS
R2 EB 5	27	34	7	27%	PASS
R2 EB 6	36	38	2	6%	PASS
R2 EB 7	25	23	1	-5%	PASS
R2 EB 8	102	111	9	9%	PASS
R2 EB 9	69	54	16	-23%	PASS
R2 EB Total	***364***	***371***	***6***	***2%***	***PASS***
R2 WB 1	62	46	16	-26%	PASS
R2 WB 2	87	94	7	8%	PASS
R2 WB 3	51	29	22	-44%	PASS
R2 WB 4	135	137	2	1%	PASS
R2 WB 5	75	51	24	-33%	PASS
R2 WB 6	15	10	6	-38%	PASS
R2 WB 7	45	37	9	-19%	PASS
R2 WB Total	***471***	***402***	***69***	***-15%***	***PASS***

AVERAGE QUEUES

Junction	Ref.	Approach Name	08:00-09:00 AM Base	AM 2036 Ref	AM 2036 Ref + Buckover	AM 2036 With Dev No Link Road	AM 2036 With Dev With Link Road	AM 2036 With Dev With Link Road (VISSIM Routing)	AM 2036 With Mitigation	Approach Name	17:00-18:00 PM Base	PM 2036 Ref	PM 2036 Ref + Buckover	PM 2036 With Dev No Link Road	PM 2036 With Dev With Link Road	PM 2036 With Dev With Link Road (VISSIM Routing)	PM 2036 With Mitigation
Site 1	1	A38 Gloucester Road North	74	193	223	105	212	180	111	A38 Gloucester Road North	27	208	452	219	376	363	120
	2	M5 East	195	414	421	450	454	448	442	M5 East	37	136	424	325	411	319	99
	3	A38 Gloucester Road South	37	29	29	31	31	28	22	A38 Gloucester Road South	83	423	425	424	422	407	307
	4	M5 West	226	210	243	217	219	202	225	M5 West	60	63	198	82	138	86	89
	5	A38 Gloucester Road North (Ahead/Right)	346	305	292	267	300	289	296	A38 Gloucester Road North (Ahead/Right)	11	15	15	15	14	26	15
	6	A38 Gloucester Road North (Left)	352	19	72	43	20	19	19	A38 Gloucester Road North (Left)	53	20	12	37	18	29	17
Site 2	7	Bradley Stoke Way	46	131	129	141	141	121	106	Bradley Stoke Way	26	74	95	107	105	56	33
	8	A38 Gloucester Road South	110	446	454	451	452	453	447	A38 Gloucester Road South	38	480	485	484	485	479	118
	9	Park Avenue	4	4	4	4	4	4	4	Park Avenue	105	196	211	226	188	206	115
	10	Woodlands Lane (Right)	26	93	106	364	316	156	57	Woodlands Lane (Right)	152	100	92	223	186	77	156
Site 3	11	Woodlands Lane (Left)	2	9	30	87	118	75	1	Woodlands Lane (Left)	96	32	30	136	115	30	134
	12	Bradley Stoke Way East	6	115	131	411	384	128	92	Bradley Stoke Way East	4	68	140	346	271	30	7
	13	Bradley Stoke Way West	6	9	9	13	11	12	8	Bradley Stoke Way West	28	45	20	53	40	31	36
	14	Bradley Stoke Way West	1	0	0	0	0	1	1	Bradley Stoke Way West	9	9	8	23	15	11	10
	15	Pear Tree Road	0	1	1	8	4	1	1	Pear Tree Road	12	12	11	141	41	29	8
Site 4	16	Bowsland Way	2	3	3	167	87	8	24	Bowsland Way	10	17	13	196	46	24	9
	17	Bradley Stoke Way East	1	2	2	156	125	6	8	Bradley Stoke Way East	6	8	11	91	58	7	4
	18	Brook Way	5	27	46	257	229	58	68	Brook Way	6	29	52	215	126	27	9
	19	A38 Gloucester Road South	11	17	13	14	16	14	14	A38 Gloucester Road South	36	51	82	36	109	45	76
Site 5	20	A38 Gloucester Road North	24	176	300	168	183	164	175	A38 Gloucester Road North	20	41	295	41	46	31	34
	21	Hortham Lane (Left)	8	9	21	9	21	62	155	Hortham Lane (Left)	3	4	4	4	7	18	15
	22	Hortham Lane (Right)	7	9	20	9	20	62	156	Hortham Lane (Right)	2	3	3	3	5	19	15

JOURNEY TIMES

08:00-09:00

Route		AM Base	AM 2036 Ref	AM 2036 Ref + Buckover	AM 2036 With Dev No Link Road	AM 2036 With Dev With Link Road	AM 2036 With Dev With Link Road (VISSIM Routing)	AM 2036 With Mitigation
R1 NB 1	1	24	25	25	224	189	31	35
R1 NB 2	2	13	16	17	49	45	18	18
R1 NB 3	3	14	23	26	64	60	25	22
R1 NB 4	4	27	111	115	199	194	107	77
R1 NB 5	5	70	127	126	133	133	120	112
R1 NB 6	6	30	28	28	28	28	28	28
R1 NB 7	7	8	8	8	8	8	8	8
R1 NB 8	8	71	59	59	60	60	59	61
R1 NB 9	9	17	19	18	19	19	19	19
R1 NB 10	10	108	114	115	111	112	111	112
R1 NB 11	11	58	60	59	60	61	61	60
R1 NB 12	12	57	58	58	58	58	58	58
AM R1 NB		**496**	**646**	**653**	**1011**	**967**	**645**	**611**
R1 SB 1	13	54	78	97	75	79	76	76
R1 SB 2	14	57	69	92	60	71	70	65
R1 SB 3	15	203	313	323	202	307	270	230
R1 SB 4	16	48	36	33	29	34	34	35
R1 SB 5	17	77	44	45	45	45	44	43
R1 SB 6	18	19	21	21	22	21	21	20
R1 SB 7	19	27	28	28	27	28	29	28
R1 SB 8	20	16	16	16	16	16	16	16
R1 SB 9	21	5	5	4	4	4	5	5
R1 SB 10	22	28	29	29	35	33	30	29
AM R1 SB		**534**	**638**	**687**	**514**	**637**	**596**	**546**
R2 EB 1	23	78	314	319	318	316	319	316
R2 EB 2	24	37	46	46	46	46	46	46
R2 EB 3	25	7	7	7	7	7	7	7
R2 EB 4	26	38	36	36	37	36	36	37
R2 EB 5	27	29	29	29	30	30	30	28
R2 EB 6	28	42	44	44	47	46	44	43
R2 EB 7	29	30	33	34	36	37	54	44
R2 EB 8	30	97	102	97	112	107	110	104
R2 EB 9	31	50	50	50	52	51	53	52
AM R2 EB		**409**	**661**	**661**	**685**	**676**	**699**	**677**
R2 WB 1	32	50	51	51	175	55	61	54
R2 WB 2	33	113	126	123	312	172	226	151
R2 WB 3	34	28	32	28	147	91	49	26
R2 WB 4	35	70	170	187	415	397	232	137
R2 WB 5	36	72	128	128	130	131	121	109
R2 WB 6	37	10	9	9	9	9	9	9
R2 WB 7	38	36	36	36	37	36	36	37
AM R2 WB		**377**	**553**	**562**	**1225**	**890**	**734**	**523**

17:00-18:00

Route	PM Base	PM 2036 Ref	PM 2036 Ref + Buckover	PM 2036 With Dev No Link Road	PM 2036 With Dev With Link Road	PM 2036 With Dev With Link Road (VISSIM Routing)	PM 2036 With Mitigation
R1 NB 1	30	31	35	108	79	30	27
R1 NB 2	15	16	20	37	30	15	14
R1 NB 3	13	19	27	60	46	14	13
R1 NB 4	24	78	133	225	197	42	27
R1 NB 5	40	82	100	106	104	62	43
R1 NB 6	7	35	37	35	35	23	12
R1 NB 7	28	45	45	44	45	39	29
R1 NB 8	58	143	143	142	142	143	117
R1 NB 9	14	16	15	17	16	18	13
R1 NB 10	122	127	147	124	148	125	140
R1 NB 11	66	67	70	66	86	69	75
R1 NB 12	57	57	58	58	59	58	59
PM R1 NB	**473**	**718**	**831**	**1022**	**986**	**639**	**569**
R1 SB 1	53	58	102	58	58	55	56
R1 SB 2	56	57	100	57	66	59	57
R1 SB 3	147	313	566	320	478	509	265
R1 SB 4	18	41	43	41	49	36	44
R1 SB 5	56	53	46	64	51	49	53
R1 SB 6	27	33	26	32	30	28	28
R1 SB 7	24	27	26	29	27	27	27
R1 SB 8	21	21	20	23	22	21	21
R1 SB 9	7	7	6	7	7	7	7
R1 SB 10	29	30	30	34	31	29	29
PM R1 SB	**437**	**640**	**965**	**665**	**820**	**821**	**586**
R2 EB 1	38	417	431	418	434	394	82
R2 EB 2	33	55	56	54	56	53	35
R2 EB 3	7	19	20	18	19	15	11
R2 EB 4	32	18	17	20	18	20	26
R2 EB 5	34	39	27	41	36	33	33
R2 EB 6	38	40	37	42	39	40	42
R2 EB 7	23	24	23	26	25	27	27
R2 EB 8	111	111	108	127	120	138	127
R2 EB 9	54	54	54	55	55	59	59
PM R2 EB	**371**	**778**	**774**	**801**	**804**	**779**	**441**
R2 WB 1	46	46	46	49	48	62	63
R2 WB 2	94	95	94	106	104	110	109
R2 WB 3	29	28	28	52	44	28	30
R2 WB 4	137	111	109	171	154	93	131
R2 WB 5	51	80	93	98	95	66	55
R2 WB 6	10	9	9	9	9	9	9
R2 WB 7	37	37	37	37	37	37	37
PM R2 WB	**402**	**406**	**416**	**522**	**491**	**406**	**433**



APPENDIX G: SUSTRANS CYCLE STARTEGY

Woodlands, Bristol

Walking and Cycling Strategy

September 2017






About Sustrans

Sustrans is the charity making it easier for people to walk and cycle.

We are engineers and educators, experts and advocates. We connect people and places, create liveable neighbourhoods, transform the school run and deliver a happier, healthier commute.

Sustrans works in partnership, bringing people together to find the right solutions. We make the case for walking and cycling by using robust evidence and showing what can be done.

We are grounded in communities and believe that grassroots support combined with political leadership drives real change, fast.

Join us on our journey. www.sustrans.org.uk

Head Office
Sustrans
2 Cathedral Square
College Green
Bristol
BS1 5DD

© Sustrans Month 2017
Registered Charity No. 326550 (England and Wales) SC039263 (Scotland)
VAT Registration No. 416740656

Revision	Description	Author	Check	Date
#0.5	Draft (excluding costs)	RC	SP	16/10/17
#1.0	Final	RC	SP	09/01/18

Contents

Our approach	4
Designing for busy roads	4
Strategic cycling routes	6
Principal cycling routes	6
Secondary cycling routes	6
Overview of cycling routes	7
A38 Gloucester Road	8
The selected routes	8
Interventions	8
Deliverability	9
Walking routes	9
Concorde Way, Woodlands to City Centre	10
Cribbs Causeway via Aztec West	19
Almondsbury Business Park	31
Filton North Link	36
UWE Link	40
Filton South Link	42
Woodlands Park, walking strategy	46

Woodlands, Bristol

Introduction

Sustrans has been commissioned by Vectos, transport planning specialists, to advise on a strategic route strategy for active travel for the proposed development of Woodlands as a residential settlement.

The project brief, appended, proposes adopting an innovative approach utilising European city wide strategies that emphasise quality of life.

The focus is on creating High Capacity Transport Networks (HCTN) serving the major trip destinations defined and shown on map 1.

HCTN are those that achieve the most people per unit surface area, and are often the most effective and environmentally desirable. The highest capacity modes are walking and cycling, followed by public transport and the private car.

Our approach

Assumptions

The aim is to propose a number of key routes for walking and cycling, which may not coincide to serve the destinations defined.

For walking trips we have assumed that the longest walk for commuting will be three kilometres, about 30 minutes' walk.

Cyclists will travel further and the defined destinations are within 8 kilometres, about 30 minutes to cycle, or more in the case of the city centre destination.

It seems reasonable to assume that the employment concentration and size of the city centre will attract the largest number of journeys from the site. The smaller destinations are limited in size and employment density, and will attract fewer journeys.

We therefore adopt differing approaches for the primary route serving the city centre, and the secondary routes serving suburban locations.

We have had regard to a range of published guidance in making our proposals. We have been referred to the precedent of the London Cycle Superhighways as an example of a HCTN, and we have been guided by the design principles and solutions of the London Cycle Design Standards (LCDS) in our proposals.

London and Bristol are obviously very different in scale and population density, traffic management and the simple number of people travelling in London is very much higher than in Bristol.

We have sought to follow the guiding core principles of cycle route design as set out in Sustrans Design Manual. It is implicit that provision should cater for future growth in demand and provide accordingly.

Primary routes

In line with this thinking we have sought to propose a solution in line with the standards of the Cycle Superhighway (CS) for arterial routes. The CS are high capacity routes that provide safer ways of getting into and across the central city along recognised main routes, normally roads.

It is implicit that to achieve a CS re-allocation of road space from private car to active travel modes and public transport will be necessary.

Secondary routes

Secondary routes do not follow usually main roads, so a different approach is needed. Secondary routes where lower potential demand is expected are closer to London Quietways, (QW) defined as:

The QWs aim to complement CS, by developing radial and orbital routes across the urban area that make use of lower-traffic back streets, railway and tow paths and parks to provide a comfortable option for cyclists with less confidence, or those that just prefer a more gentle pace. By having a badged coherent network, and addressing key barriers along the routes, QWs will play a key part in encouraging a wider take up of cycling.

Our aim is to propose secondary routes that enable journey times for cyclists that are quicker than public transport, and at peak times, as quick as or quicker than the private car.



Figure 1: Sustrans Design Manual

Designing for busy roads

Recently published guidance from Highways England (Interim Advice Note 195/16) is a useful starting point when considering whether the busier roads are likely to be suitable for cycling and walking.

This guidance suggests that the key threshold at all traffic speeds is an average annual daily traffic flow of 5,000 vehicles per day (vpd). At higher traffic flows, physical separation from motor vehicles is recommended.

Reducing traffic speed from 30mph to 20mph is clearly desirable, but if traffic flows cannot be reduced below 5,000 vpd, then physical separation will still be required. In these situations it is tempting to accommodate cyclists on existing footways, but this is not acceptable if it means a reduced level of service for pedestrians.

Speed Limit	Average Annual Daily Traffic (AADT)	Minimum Provision
40+	All flows	Cycle Tracks
30	0-5,000	Cycle Lanes
	>5,000	Cycle Tracks
	<2,500	Quiet Streets
20	2,500-5,000	Cycle Lanes
	>5,000	Cycle Tracks

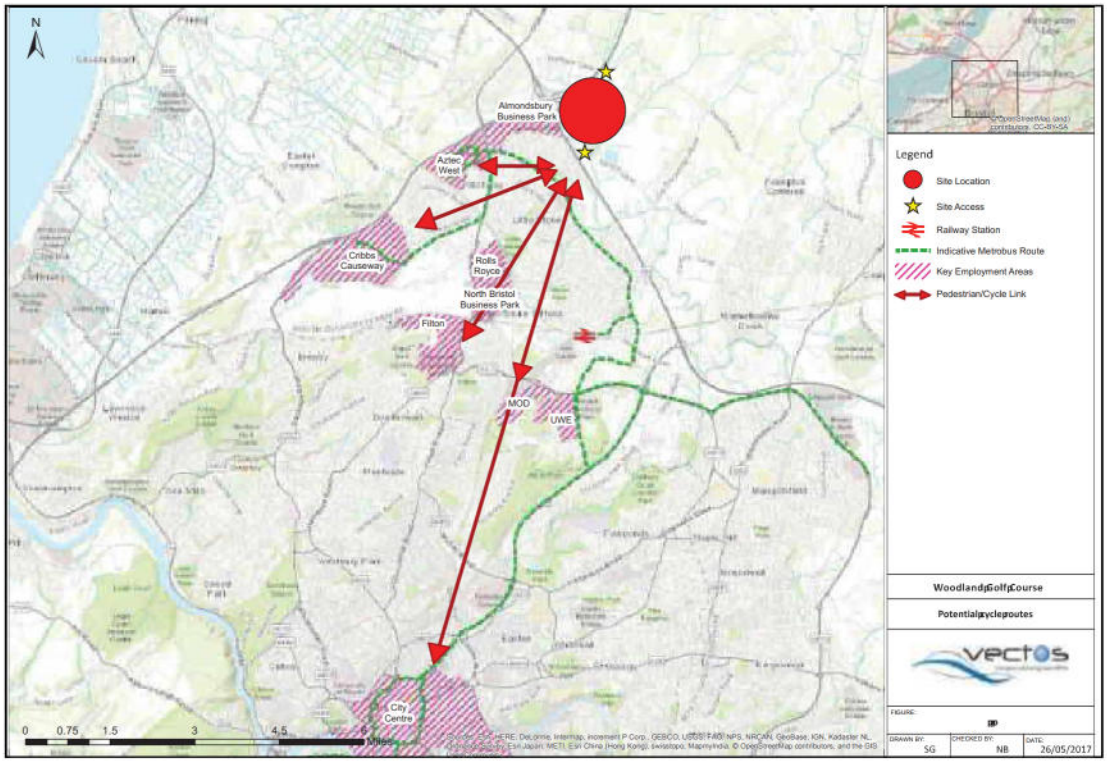
From Interim Advice Note 195/16

Sustrans recommends a minimum shared path width of 3.0 metres in an urban setting, with reduced widths acceptable in certain circumstances. The table below is taken from the Sustrans Design Manual, a handbook for cycle-friendly design.

On some roads it may not be possible to accommodate cycle lanes, cycle tracks or a shared path and the designer must consider other alternatives, such as closing the road to through traffic or finding a different route alignment.

Type of route	Minimum path width
Urban traffic free	3.0m on all main cycle routes, secondary cycle routes, major access paths and school links; wider on curves and steep gradients. 2.5m possible on access routes and links with low use
Urban fringe traffic free	3.0m on all main cycle routes, major access paths and school links 2.5m possible on lesser secondary cycle routes and access links
Rural traffic free	2.5m on all main routes, major access paths and school links 2.0m possible on lesser routes and links

From Sustrans Design Manual



Map 1: Origin and destinations; desire lines

Strategic cycling routes

The brief is to propose strategic routes for cycling and walking to key destinations from the proposed Woodlands development area.

We distinguish between principal routes and secondary routes.

Cycling levels in Bristol has been monitored routinely at a number of locations since 1997, and over a set of consistent location and data sets since 2008. The trend between 2008 and 2015 has been an increase in cycling levels combined on road and traffic free monitoring locations of 85%. Growth in usage on traffic free routes is faster than for on-road routes. (Source Bristol City Council).

High volume routes are used on average daily counts (5 day period average) in 2015:

Cheltenham Road / Gloucester Road (A38):	3,541
Bristol Bath Path	1,719
Concorde Way (Muller Rd)	569

(Concorde Way data does not cover comparable period and has grown at a higher rate showing 70% growth since 2012 to 2015)

As a comparison the annual average daily flow (AADF) reported on the A38 near Aztec West in 2015 was 386, with no clear trend in growth apparent in the period 2008 to 2015 during which the highest AADF was 596 in 2011, and the lowest was 386 in 2015 (Source: DfT Traffic counts).

Map 2 is a graphic representation of the volume of cycle traffic on a number of key routes in Bristol based on an analysis of 2011 Census data.

The data mapping does not extend into South Gloucestershire, where Woodlands is located, but it clearly shows how the high volume / capacity routes are aligned with the A4018, the A38, and the Bristol Bath Railway Path. Significant volume is also apparent on the Frome Greenway (east of the M32) and links to it from the north. The data is now somewhat historic, and predates recent improvements to the Concorde Way. The trend across Bristol suggests that current usage significantly exceeds the 2011 Census level.

Primary cycling routes

The aim is to identify High Capacity Transport Networks, as outlined in the introduction.

Based on the available data, it is reasonable to assume that the highest demand for travel will be from Woodlands towards the city centre of Bristol, as indicated in the origin and destination map provided in the brief.

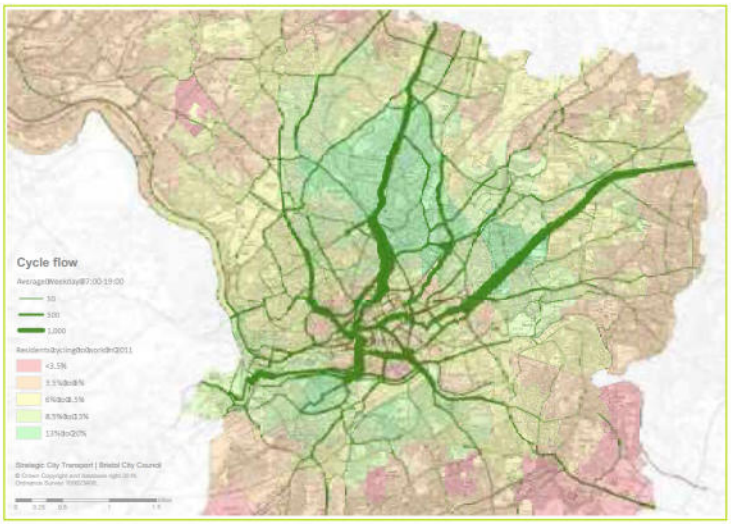
The existing routes used by cyclists in this corridor are the A38, and Concorde Way.

Our focus has been on these routes.

Secondary cycling routes

Secondary routes are expected to attract lower usage, serving destinations which have smaller concentrations of employment, and thus reduced attraction.

We have selected secondary routes on the same criteria as the primary routes, but recognise that lower usage will not demand such high capacity.



Map 2: 2011 Census derived cycle flow

Overview of cycling routes

An image of the origin and destinations, and the desire lines as identified for the Woodlands site is shown as Map 1

We have used this as a guide and sought to identify routes on the ground which are capable of conforming to the criteria and guidance outlined in the introduction.

All the routes have been inspected, and where appropriate, alternatives have been investigated (but are not generally referenced here).

In reporting on the routes we have located points on the routes (audit points) where interventions are recommended to create new facilities or enhance existing ones.

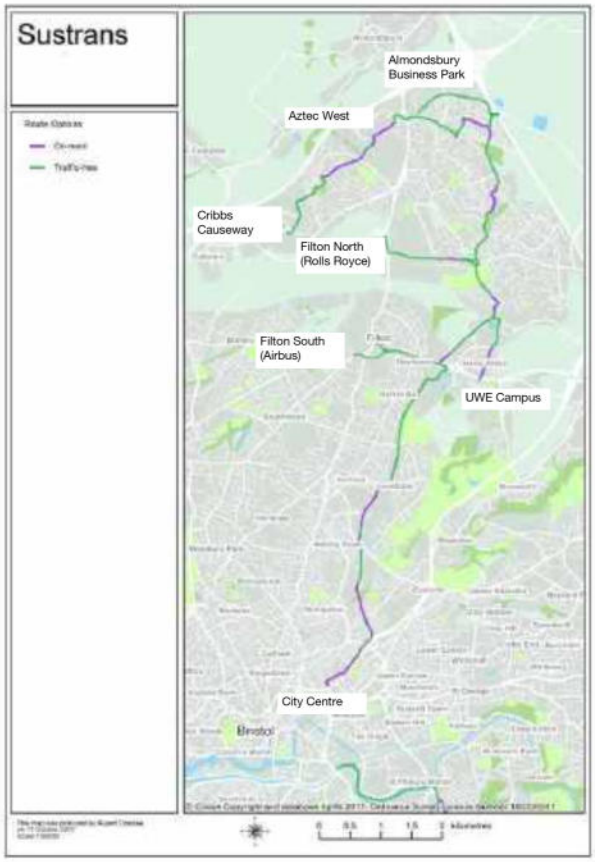
The audit points are shown on the maps following, and opposite each map a table and photographs describing the location and in outline the barriers to cycling there, a description of the existing issues, and a recommended intervention.

Map 3 shows the routes in overview.

We anticipate that that the north / south route connecting Woodlands, Filton and the centre of Bristol would attract the greatest level of commuter traffic as it serves the greatest concentration of employment in the city centre and Filton.

The most direct route on this desire line would be the A38, the main arterial northwards from Bristol centre

.



Map 3:

A38 Gloucester Road

The A38 is accessible from Woodlands via two routes, the main route being described in the chapter dealing with the Cribbs Causeway link..

The A38 is a major arterial route between the M4, North Bristol and the centre. It is heavily trafficked (over 30,000 vehicles per day in 2016). In the northern part, between Aztec West and Filton, it is a dual carriageway with a 40 mph speed limit. From Filton southwards it is a single carriageway road. Approaching the city centre, as it passes through Horfield and Bishopston, it is a very well patronised high street shopping street, where the speed limit is 20 mph. It is a main bus route throughout.

The guidance on cycle provision clearly indicates that provision on such a road must be segregated, and in order to achieve the standards and capacity required a separate cycle track would be the preferred solution, as delivered in London as Cycle Super Highway.

The physical constraints of the A38 preclude such provision in our opinion unless there is a re-allocation of road space for the purpose. This is particularly challenging south of Filton and through Horfield and Bishopston.

A major scheme entailing a northern Park & Ride site; lane removal; mass transit; permeable filters and other measures could be necessary to create the conditions which would allow a high capacity transport network on the A38. Some research indicates that similar measures which enhance cycle provision do not lead to increased congestion.

Such a scheme is beyond the remit of this study but should be considered by the Councils for the future.

The selected routes

For these reasons, our audit concentrates on the Concorde Way, an existing designated cycle and walking route which connects Bradley Stoke to the City Centre. The current levels of use of Concorde Way are substantially lower than the similar Bristol Bath Railway Path. The latter is arguably at capacity, and cycle and pedestrians should be separated. At current levels of growth, the Concorde Way could face the same issue within a few years, which would be alleviated The principle cycling route is referred to as the Concorde Way. Concorde Way is an existing cycle route between Bradley Stoke and Bristol centre. Much of our recommended route coincides with Concorde Way, but we have recommended significant changes and improvements.



Photos showing conditions on the northern section of A38

The secondary cycling routes are links to:

- Almondsbury Business Park
- Cribbs Causeway and Aztec West from Woodlands;
- Filton North (Rolls Royce) via the Concorde Way;
- UWE campus via Concorde way;
- Filton South (Airbus) site via Concorde Way.

Each route is described in detail in the following sections.

Interventions

Having regard to the core principles referred to in the introduction, we have assessed the nature of each of the recommended type of intervention we recommend to indicate its significance to the integrity of the route as a whole.

This is intended as a guide for designers, accepting that at later stages, when the recommendations are being designed and implemented, design compromises are inevitable.

It should be recognised however that the omission of individual items, while not perhaps of significance in isolation, will impact to some degree on the route as a whole, and that the overall effect of changes should be considered in the round.

We have categorised the impact of interventions under three heads:

Critical

An intervention that is critical to the route, without which the route cannot be considered to be conforming to the core design principles, and will not function as a high capacity commuter route.

Critical issues are specifically highlighted for each route.

We have also highlighted for each route where the acquisition of third party land may be required to deliver the recommendations.

Significant

Important for the integrity of the route, such that omission would seriously degrade the quality of the route and risk a failure to meet the design criteria.

The type of intervention in this category would be:

- New traffic free paths
- New road crossings
- Cycle priority crossing of side roads
- Path widening where existing path width is narrower than 2.5 metres
- Vegetation management
- Removal of unnecessary barriers
- Removal of obstructions to sightlines

Beneficial

Minor interventions which taken in total would make a valuable contribution to the quality of the route and conformity with core design principles. Omission of items which are beneficial would potentially supress potential usage levels.

The type of intervention in this category would be:

- Widening paths with existing width exceeding 2 5metres.
- Induction loops on toucan crossing approaches

Deliverability

We have not formally assessed the feasibility of the recommendations we have made, but in general they are within the realm of standard practice.

We anticipate that designers and others will take forward this work through feasibility and design stages, and recognise that there will be changes and modifications as a result.

A key issue however in the context of a number of recommendations is the cooperation of third party landowners, whether private or public. We have identified where this is the case, but have not identified the owner or had any consultations.

Walking routes

We have made the assumption that commutes on foot will be made up to a distance of 3 kilometres, 30 minutes walking time. This is likely to be at the upper end of the range of typical walking commuting distances.

We have identified the significant locations to which Woodlands residents are likely to walk, in line with the destinations adopted for cycling but including the Willows retail centre at Bradley Stoke, and the adjacent Metrobus stop.

Walking routes are likely to be more variable than cycling routes, and any highway, footpath, park and other facility open to people on foot. We have mapped walking routes for the purpose of demonstrating possible walking routes and distances to the destinations, but it is not the intention to specify routes which would be signed on the ground, or to recommend measures to enhance the routes in general. We have where applicable highlighted any critical issues, as defined in relation to cycle routes, if they apply to walking routes.

Concorde Way, Woodlands to City Centre

Overview

- Distance: 12 kilometres (from centre of Woodlands site)
- Cycling time: 40 minutes
- Hilliness: no significant change in level

The route largely follows an existing signed route which is mostly traffic free on shared use footways and traffic free paths.

Critical issues

(Refer to route description)

The following points are considered to be critical to the achievement of the entire route.

101.7 Section of unsurfaced path linking Ellicks Close and Bradley Stoke Way.

102.6 Section of shared footway to be widened

104.1 Hatchet Road: provision of cycle facility between Winterbourne Road and Parkway Ratcliffe Drive.

104.6 Creation of subway under railway at Parkway Station approach.

107.2 Re-alignment of entry to Concorde Way from Hopetoun Road, St Werbergh's

107.3 Modification of mini-roundabout Mina Road, James Street, St Werbergh's

Deliverability

Third party land permissions would be required to deliver:

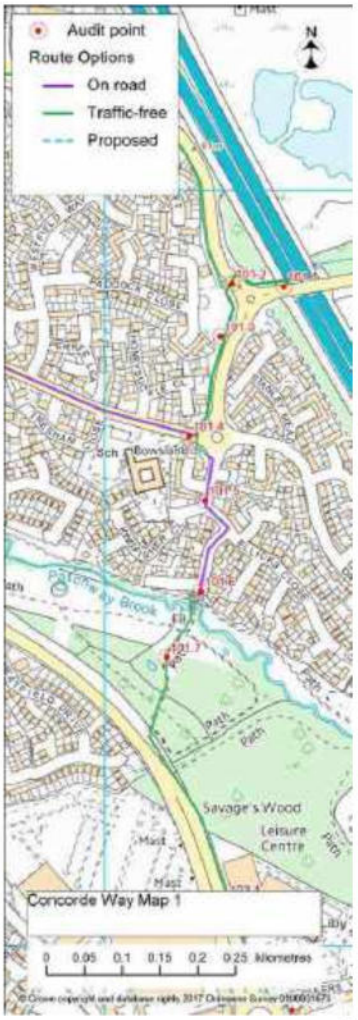
101.7 Public open space off highway

104.6 Network Rail

107.2 Bristol City Council allotments



Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
ConcordeWay Brook Way	102	6			Width, Vehicle volume, Vehicle speed	No shared use path between Hawkins Crescent and entrance to Stoke Brook path to join with existing shared use footway	Create new shared use or segregated path to link to existing shard use footway. Require relocation of signpost. Path to be located at rear of bus stop
Concorde Way, Brook Way	103	1			Width	Designated shared use footway Width less than 3 m Wide grass verge separation from carriageway	Widen path to 3 m
Concorde Way, Orpheus Avenue roundabout	103	2			Layout	Crossing of Baileys Court Road Splitter island adequate width Approach lanes do not slow vehicles approaching roundabout	Increase vehicle deflection on Baileys Court Road approach Narrow lanes to slow vehicles at junction Install raised table; consider cycle and pedestrian priority at crossing.
Concorde Way, Orpheus Way	103	3			Layout, Width	Shared use path Width less than 3 m Obstructed by lamp standards	Increase path width to 3 m Either provide min 2.5 m at rear of lamp standards, or relocate lamps off back of path
Concorde Way, Orpheus Way	103	4			Layout	Shared use path runs between bus stop and carriageway	Re-align path at min 2.5 m to rear of bus stop



Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
Concorde Way, Bradley Stoke Way	102	1			None	Shared use path both sides or Bradley Stoke Way. 3 m approx width. Set at rear of bus sop.	Preferable to path on other side of road to avoid crossing access to Willow Brook Centre for buses, and narrow path in front of Centre and possible conflict with pedestrians
Concorde Way Bradley Stoke Way Junction Fiddlers Wood Lane	102	2			Crossing	Unmarked crossing of two single carriageways	Cycle priority would be possible
Concorde Way Bradley Stoke Way Toucan crossing	102	3			Crossing	Toucan crossing	Induction Loops to trigger green crossing phase for cycles
Concord Way Diana Gardens and Bradley Stoke Way	102	4			Other	Short traffic free link connects Bradley Stoke Way and Diana Gardens	Signage only Vegetation control
Concorde Way Hawkins Crescent and Diana Gardens	102	5			None	Very lightly trafficked residential streets and traffic free sections	No intervention necessary except for signage

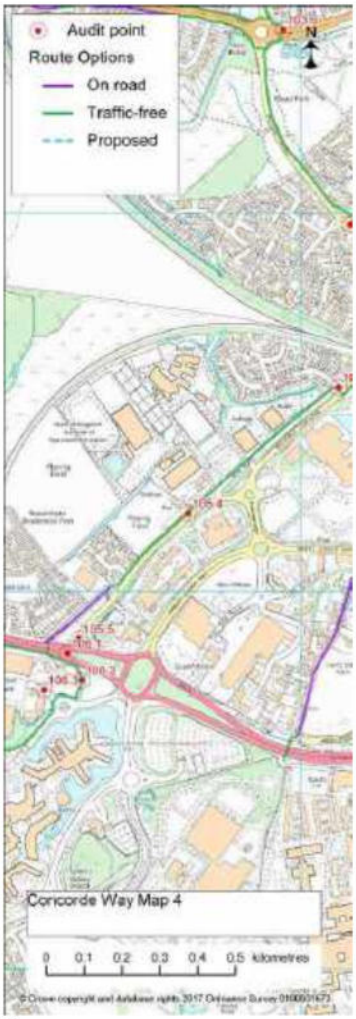
Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
ConcordeWay Brook Way					volume, Vehicle speed	No shared use path between Hawkins Crescent and entrance to Stoke Brook path to join with existing shared use footway	Create new shared use or segregated path to link to existing shard use footway. Require relocation of signpost. Path to be located at rear of bus stop
Concorde Way, Brook Way						Width less than 3 m Wide grass verge separation from carriageway	Widen path to 3 m
Concorde Way, Orpheus Avenue roundabout						Splitter island adequate width Approach lanes do not slow vehicles approaching roundabout	Increase vehicle deflection on Baileys Court Road approach Narrow lanes to slow vehicles at junction Install raised table; consider cycle and pedestrian priority at crossing.
Concorde Way, Orpheus Way						Width less than 3 m Obstructed by lamp standards	Increase path width to 3 m Either provide min 2.5 m at rear of lamp standards, or relocate lamps off back of path
Concorde Way, Orpheus Way						stop and carriageway	Re-align path at min 2.5 m to rear of bus stop



Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
Concorde Way, Stean Bridge roundabout	103	5			Layout, Width	Crossing of Stean Bridge Road; single carriageway, two way, no refuge Quiet secondary road. Crossing requires significant deviation from desire line	Re-position crossing to close to junction with roundabout. Widen path to 3 m Install raised table at crossing and give cyclists and pedestrians priority
Concorde Way, Winterbourne Road crossing	103	6			Layout	Toucan crossing of dual carriageway: two stages	Re calibrate for single stage crossing Insert induction loop detectors for approaching cyclists
Concorde Way, Hatchet Road	104	1			Width, Vehicle volume, Vehicle speed	High volume of vehicles No cycle facilities	Metrobus proposal for Hatchet Road includes a shared use cycleway / footway on the west side; road widening for two lanes of traffic plus a south bound bus lane (open to cycles) and 2 m wide footway on east side. Propose that this should be revised
Concorde Way, Ratcliffe Drive crossing	104	2			Crossing	Road is moderately busy. Speeds at junction here low.	Speed reduction at crossing could be achieved by raised table to transit junction including splitter island
Concorde Way, Hatchet Lane	104	3			Layout	No cycle connection between Ratcliffe Road crossing and Hatchet Lane (closed Road)	Continue route on grass verge in front of Tesco Express
Concorde Way, North Road	104	4			Vehicle volume, Vehicle speed	No segregated facility Relatively quiet road but significant traffic	Consider 20mph speed limit

Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
Concorde Way, Parkway Station Approach	104	5			Crossing	Pedestrian crossing	To align with tunnel / subway Raised table crossing and cut through low bank to link to North Road / Hatchet Lane
Concorde Way, Parkway station approach	104	6			Width, Land	Width of Road under railway bridge does not allow any provision for cycling and cyclists must use a narrow footway or stay on highway Hatchett Road under the railway is the principal road from Filton to Bradley Stoke	It may be possible to create a subway through the railway embankment east of Hatchett Road. Note that the land on the south side of the railway is significantly lower ground level than that on the north side, however it could be possible to excavate from the north side to meet the level on the south side.
Concorde Way, South of Parkway Station	105	1			Land	See 4.6 Southern access to railway embankment	Subway below railway required to avoid narrow substandard section of shared footway.
Concorde Way, Church Road, South of Parkway Station	105	2			Crossing, Width	Shared use path Church Road less than three metres on corner. Crossing informal dropped kerbs	Raised table at crossing Widen path at corner.
Concorde Way, South of Parkway station	105	3			Crossing	Toucan crossing	None required





Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
Concorde Way New Road	105	4			Layout	No cycle priority	All other entrances on New Road have cycle priority or raised table this should be consistent
Concorde Way, New Road, Filton	105	5			Layout	New Road; trafficked section. Low volumes and speeds. Transition to footway near crossing of A4174 is poorly laid out.	Rationalise barriers at transition approach to A4174 crossing to ensure minimal change of direction and obstruction for users.
Concorde Way, Filton Abbeywood	106	1			Crossing	Two stage light controlled crossing (toucan).	Preferably operate as single stage crossing, with induction loop activation.
Concorde Way, Filton Abbey Wood	106	2			Other, Width	Segregated footway. Total width approx 2.5 m. Vegetation reduces width	Vegetation management. Potential to widen path to exceeding 3 m.
Concorde Way, Filton Abbeywood	106	3			Crossing	Informal crossing of entrance to retail park	Cycle priority crossing / raised table

Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
Concorde Way, Filton Abbeywood	106	4			Width, Land	Busy section of traffic free path. Width approx 3 m; segregated by white line. Access to Filton Abbeywood railway station	Boundary features may preclude widening, but width should ideally be increased.
Concorde Way, Filton Abbeywood	106	5			Width, Land	Short narrow section of path between palisade fencing restricts effective width to less than 2 m	If possible relocate railway fence to obtain extra width for path.
Concorde Way, Filton	106	6			Layout, Crossing	Route of Concorde Way has been revised. Refuge on Bonnington Walk now out of line with crossing. No shared use on south side of road. Drop kerbs not yet installed	Designate shared use path on south side to crossing point Relocate refuge (and if possible widen for cycle use)
Concorde Way, Lockleaze	106	7			Other	Modern shared use path, 3 m width Vegetation obstructs path	Vegetation management needed
Concorde Way, Lockleaze Road	106	8			Other	On road section, Lockleaze Road and Dovercourt Road Signage missing and obscured	Replace signage Manage vegetation





Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
Concorde Way, Lockleaze Road	106	8			Other	On road section, Lockleaze Road and Dovercourt Road Signage missing and obscured	Replace signage Manage vegetation
Concorde Way, Petherbridge Way	106	9			Layout	Petherbridge Way serves a number of industrial and retail units, one large unit being vacant (2017).	If re-occupation involved significant increased traffic widening the footway on the east side of the road, and providing a raised table at the crossing point to the bridge over the Purdown gully could be considered. Would require loss of on street car-parking.
Concorde Way, Ashley Down	107	1			Layout, Other	Sight lines at junction of paths obscured by vegetation. Street furniture in path	Manage vegetation to clear sightlines Relocate lamp standard
Concorde Way, Mina Road / Hopetoun Road St Werberghs	107	2			Layout, Gradient, Land	There are two access onto Concorde Way: from Hopetoun Road and from Mina Road. The Mina Road access is narrow and steep with poor forward visibility. There is a history of conflict between pedestrians and cycles. Path width to both accesses is	Open sight lines to Hopetoun Road and close Mina Road access to cycles. Widen access to Hopetoun Road through acquisition of allotment land adjacent. This would allow path to be straightened and forward visibility improved.
Concorde Way, Mina Road, St Werberghs	107	3			Layout, Vehicle speed	Mini-roundabout at junction of James Street and Mina Road. Reported history of near misses. James Street alignment encourages higher speeds. Poor provision for pedestrians crossing James Street.	Review layout of roundabout Consider reducing radii on approaches and introducing deflections on James Street. Install pedestrian refuges at junction on James Street Possible raised table at junction.



Cribbs Causeway via Aztec West

Overview

- Distance: 5.5 kilometres (from centre of Woodlands site)
- Cycling time: 20 minutes
- Hilliness: no significant change in level

The route consists of some off road sections through woodland and recent highway improvements.

Critical issues

(Refer to route description)

The following points are considered to be critical to the achievement of the entire route.

202.1 Treatment of Britannia road due to presence of larger vehicles.

206.1 Example of a number of improvements proposed within Aztec West that are subject to landowner permission due to being privately owned.

207.2 Providing a safe priority crossing for users to reach Bradley Stoke Way and avoid busy roundabout.

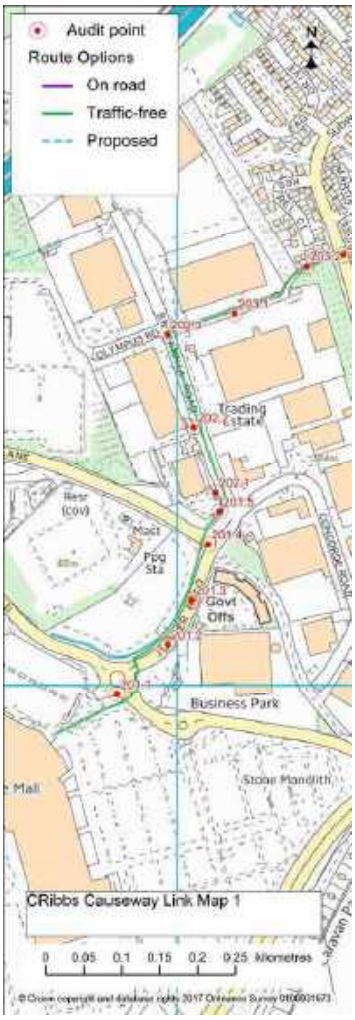
208.6 User route conflicts with existing bus stop. To resolve by widening path or moving bus stop.

210.5 Treatment of roundabout approach and link to guide users onto off road path towards Woodland Development.

Deliverability

The roads within Aztec West are not adopted highway. Works within this area would require cooperation of the owners.





Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
Cribbs Causeway: Jupiter Road roundabout					volume, Crossing, Layout	Link to rear of Cribbs Causeway with approx 3m width throughout. Levels of vehicular traffic make crossing a challenge at peak times across the busier Pegasus Road. Awkward layout as approach tarmac path southwards from crossing with kerb lined grass area. Waiting areas in middle of crossing insufficient to wait on bicycle.	Remove kerb line of grass area to create wider direct path in keeping with desire line from Pegasus Road to Cribb's Causeway. Remove median strips for Pegasus and Jupiter Road crossings and reallocate to widen pavement space to shorten crossing distance and provide sufficient waiting space either side of crossing. These to form part of two new Toucan crossings. Due to existing junction layout, a direct route through the roundabout is deemed unfeasible.
Cribbs Causeway: Jupiter Road					Land, Crossing	3 lane road including filter lane with 2m wide roadside path and extensive green edge. Crossing across undeveloped site.	Use green space from undeveloped site to widen existing path by 1m to create 3m wide shared path for 220m. 5 existing lampposts would need relocated off path. Highlight crossing with coloured surface treatment and bicycle symbols.
Cribbs Causeway: Jupiter Road					Land	View southwards of right filter lane to access Bristol Centre for Enablement. Scale and nature of site suggests is unnecessary.	If use of land along undeveloped site is not feasible, opportunity to remove filter lane to extend existing shared path to approximately 3m to existing kerb line with addition of green edge/SuD to link in with existing rain gullies.
Cribbs Causeway: Jupiter Road						approach two Pelican crossings. Existing power cabinets restrict possible expansion. Line markings confuse legibility of route.	Reduce existing grass area to align with direct desire path from path to crossing. Remove line markings and treat as shared space with coloured surface to emphasise entry into crossing waiting area.
Cribbs Causeway: Jupiter Road/Britania Road						4m wide roadside path leading from Pelican crossing to Britannia Road. Minor issue is hedge that runs along boundary reduces visibility around corner. Also no verge buffer between path users and road.	Cut back hedge and put visual buffer in in the form of grass verge, line or coloured surface.

Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
Cribbs Causeway: Britannia Road	202	1			Width, Crossing	2m path across accesses to industrial businesses. Bicycle symbols highlight crossings but distance is a concern. Trees and verge line roadside of path. Existing road approx 10m wide with double yellow lines throughout.	Use roadspace for 250m long two-directional cycle path with planters or island separators to provide boundary to road. 3 accesses require coloured surfacing for new cycle route and existing pedestrian crossings.
Cribbs Causeway: Britannia Road	202	2			Crossing, Width	Short crossing across access highlighted with thermoplastic bicycle signs.	Re-use of roadspace to accommodate cycle path, freeing up footpath for pedestrians. Emphasise crossing with coloured surface.
Cribbs Causeway: Britannia Road	202	3			Crossing, Other	Crossing to 3m wide path between Britannia Road and Coniston Road. 'Warning Cycles Crossing' signs on approach. Road regularly used by HGVs.	Highlight crossing as part of zebra crossing due to traffic volumes that provides safer link for bicycles and pedestrians.
Cribbs Causeway: Path between Britannia Road and Coniston Road	203	1			Width, Land, Layout	3m wide shared path is well used by pedestrians. Blind corner needs resolved to make suitable.	Cut back hedge at corner. Use existing greenery to create wider entry, improving visibility with minor clearing, groundwork, aggregate and tarmac required for this.
Cribbs Causeway: Link between Britannia Road and Coniston Road	203	2			Width	3m wide shared path with greenery either side. Provides pleasant through route.	Path functions well in current form. If usage increased, could consider widening the path by clearing eastward greenery before narrows to 3m at zebra crossing on Coniston Road.

Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
Cribbs Causeway: Link between Britannia Road and Coniston Road						3m wide shared path with greenery either side. Provides pleasant through route.	Path functions well in current form. If usage increased, could consider widening the path by clearing eastward greenery before narrows to 3m at zebra crossing on Coniston Road.
Cribbs Causeway: Coniston Road crossing						residential area with railings. Approach from south obscured and restricted by hedge along boundary.	Trim hedge back to free up space for people waiting at crossing.
Cribbs Causeway: Coniston Road link						through quiet residential area. Route follows development resulting in various corners with reasonable visibility.	Standard sufficient. Path could be widened using existing grass areas and resurfacing accordingly if usage increases.



Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
Cribbs Causeway: Coniston Road link	204	1			None	3m wide off road shared path through quiet residential area. Route follows development resulting in various corners with reasonable visibility.	Standard sufficient. Path could be widened using existing grass areas and resurfacing accordingly if usage increases.
Cribbs Causeway: Coniston Road Link	204	2			Other	Quiet path winding nicely along residential frontages. Photos convey openness of path with greenery with some minor intrusions with power cabinet on path and overgrowth obscuring corners.	Cut back overgrowth where possible.
Cribbs Causeway: Coniston Road link	204	3			None	Continuation of 3m wide path link through residential area which widens in areas.	Path is sufficient in current form. Grass areas provide space for future expansion.
Cribbs Causeway: Coniston Road Link	204	4			Layout	Straight section of path before reasonably sharp corner as per residential boundary. In close proximity to pleasant picnic area in quiet area.	If usage increases, consideration to be given to widening path and re-aligning route to create shallower desire line around corner to minimise risk of collision. Telecoms/power cabinet and signpost would need relocated as part of this.
Cribbs Causeway: Coniston Road link	204	5			Layout, Width, Land, Surface	Exit from Coniston Road provides shortcut towards Stroud Road. This leads into quiet garage area at back of housing. Surfacing with various kerbstone lines.	Create visual link with coloured surfacing, widening existing path through wooded threshold.

Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
Cribbs Causeway: Stroud Road/Bradley Road					Crossing	Approx 9m wide Stroud Road leads onto more congested Bradley Road due to parking. Within 20mph area with thermoplastic bicycle symbol markings along this section.	Highlight access from garage area by retreating junction with shared coloured surface of 120sqm.
Cribbs Causeway: Bradley Road						Congested road due to parked cars in residential area, approximately 8m wide. 20mph limit in place and bicycle symbol thermoplastics throughout. 1m wide path then 1.5m roadside verge along frontages of properties.	Existing parking provides informal traffic calming as part of quiet 20mph road. Future consideration for higher usage is to utilise existing grass verge along southern edge which currently has double yellow lines and include as part of 3m wide bi-directional path plus physical buffer to traffic e.g. kerbstones, planting.
Cribbs Causeway: Bradley Road						An example of one of five junctions with Bradley Road with existing bicycle symbol thermoplastics across them. Parked cars create pinch points along route. Vehicles generally travelling at low speed as per 20mph speed limit.	Use of coloured surfacing across junctions.
Cribbs Causeway: Bradley Road						increased due to lay by with bus stop between Pretoria Road and Newham Place allowing cars to park within it. 20mph thermoplastic signs on road.	Traffic speeds and volumes do not require intervention given informal traffic calming. Any path addition would need to consider relocation of existing southbound bus stop towards Pretoria Road to allow new space to be allocated and allow through traffic.



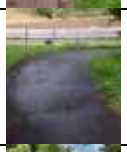
Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
Cribbs Causeway: Bradley Road						Link from Bradley Road to Waterside Drive. Wide entry onto roughly 2m wide path towards 3m wide zebra crossing. White line markings to indicate no parking where path rejoins road onto Bradley Road and Waterside Road respectively.	Works well in current form. Overrun areas could be considered for wetter seasons to pass comfortably. Highlight likely presence of cyclists from path onto Bradley Road and Waterside Drive by extending coloured surface in line with desire path.
Cribbs Causeway: Waterside Drive						Approximately 8m wide road used as parking. Dead end which means street is quiet allowing cyclists to move freely through it. Bicycle symbol thermoplastics present. Leads to gated access point as per second photo.	Remove side gate and replace with bollards. Drop kerb towards gate to widen approach for cyclists. Treat resolved access with coloured surface to highlight to users.
Cribbs Causeway: Waterside Drive						leading through quiet pedestrian area. This leads onto road with block paving detail extended, along with bicycle symbols highlighting entry and exit points. Existing NCN signpost at turn as approach block paving area.	None required
Cribbs Causeway: Waterside Drive						Existing 2.5m wide path either side of road. Road approximately 7m wide is relatively quiet. Roadside verge along paths. Option for cyclists to use path or road.	Widen paths by 1m each side. To consider proximity to trees and existing service covers. Highlight crossing with coloured surface.



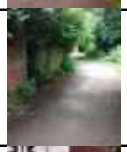
Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
Cribbs Causeway: Park Avenue						30mph road at least 10 metres wide with advisory cycle lanes either side as indicated by bicycle symbols. Good visibility at junctions with office block accesses.	Put 2.5m wide cycle lanes in place either side of the road for approximately 520m and remove centre line of road. This will help emphasise crossings at junctions. Put 20mph speed limit in place.
Cribbs Causeway: Park Avenue						roundabout. This crosses two lanes of traffic before expands to 5 at roundabout.	Put Zebra crossing in place using existing green edge to provide slip access for northbound users. Extend dropped kerbs for new access.
Cribbs Causeway: Park Avenue						takes users to shared path link.	As part of new zebra crossing to create informal crossing to link in with existing shared path avoiding roundabout. Remove existing advisory lanes in place of 2m wide cycle lanes either side. Highlight informal crossing with coloured surfacing and bike symbols.
Cribbs Causeway: Park Avenue/A38						Gloucester roundabout leading to Aztec West. Block paviour surface provides good roadside route with grass verge edge as buffer.	None



Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
Cribbs Causeway: Park Avenue/A38						Reasonable path of at least 3m after traffic light crossing point. Kink minor issue in terms of route legibility.	None
Cribbs Causeway: Bradley Stoke Way						Widens to 5m and links in well with Toucan crossings.	None
Cribbs Causeway: Bradley Stoke Way						3m wide tarmac path leading to new bus stop. Possible conflict as bus stop obstructs desire line of bicycle users and need to travel into space people may be waiting as hail bus on arrival.	Smaller street fixtures could be moved away from path prior to bus stop area to increase effective path width.
Cribbs Causeway: Bradley Stoke Way						Newly surfaced path achieving good width of approximately 4m throughout with roadside verge.	Wider tarmac run off area should be created after electrical cabinet to provide easier route.
Cribbs Causeway: Bradley Stoke Way							signage widening path is inappropriate. No intervention needed.
Cribbs Causeway: Bradley Stoke Way/Brook Way						roundabout leads onto shared path with cycle lane and pedestrian both 2m wide.	None

Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
Cribbs Causeway: Bradley Stoke Way						Lane narrows to 2m after new bus stop with overgrown hedge reducing this further.	Extend cycle path to achieve 3m width using grass verge mindful of existing inspection covers in the ground.
Cribbs Causeway: Link to Bradley Stoke Way						Path turns back from bridge to lead onto Bradley Stoke Way. Gradient and corner may pose an issue to some users.	Widen path at corners to provide wider accesses to and from slope.
Cribbs Causeway: Link to Bradley Stoke Way						sections. Shared path over bridge roughly 2m wide each for cycle and pedestrians. Both paths narrow to just over 2m due to grass and overgrowth.	Tidy up overgrown areas. Highlight route with coloured new surface. Remove bollards at the side of bridge entry to improve access.
Cribbs Causeway: Link to Bradley Stoke Way (bridge)						either side. Nature of structure makes any physical changes difficult. Line marking and cycle/pedestrian markings worn away.	Re-apply line markings and pedestrian and cycle symbols.



Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
Cribbs Causeway: Link to Bradley Stoke Way (bridge)						either side. Nature of structure makes any physical changes difficult. Line marking and cycle/pedestrian markings worn away.	Re-apply line markings and pedestrian and cycle symbols.
Cribbs Causeway: Link to Bradley Stoke Way (bridge)						worn and could require replacing in near future.	Replace line markings and symbols along bridge to make clear to path users.
Cribbs Causeway: Link to Bradley Stoke Way						section to Bowsland Way. Quiet woodland path in residential area. Patchwork repairs to ground work have resulted in raised mound before tactile paving. Symbols for which side pedestrian and cyclists are to use are worn away.	Replace bicycle/pedestrian symbols and resurface uneven section.
Cribbs Causeway: Link to Bradley Stoke Way						residential area. Some overgrowth, no major visibility issues along route.	None
Cribbs Causeway: Bowsland Way					speed	Toucan crossing of approximately 4m width provides good entry point onto 30mph road.	Bicycle symbol road markings to guide users along route. Extend existing 20mph to include this section of route.

Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
Cribbs Causeway: Bowsland Way						width of 7m. Traffic volume low but would increase during school drop off and pick up times.	Add bicycle symbols and remove centre line road marking. To form part of extension of 20mph limit at school.
Cribbs Causeway: Bowsland Way						Traffic calming throughout length of the street which includes speed cushions, traffic islands of min. 2m width for informal crossings as well as road narrowing in places reducing the effective road width to 6m approx. Followed by zebra crossing at school.	Emphasise likely presence of cyclists crossing junctions with coloured path surface 1.5m wide and bicycle symbols.
Cribbs Causeway: Bowsland Way						roundabout with road narrowing at speed humps.	Remove centre line and place bicycle symbols along road. Impact of parked cars during school times makes it unfeasible to put 1.5m wide cycle paths either side of the road for such a short distance. Geometries of roundabouts treated to help slow vehicle speeds, remove markings and
Cribbs Causeway: Bowsland Way						View of roundabout that leads onto Trench Lane. Road ascends as head northwards towards development site.	Addition of cycle paths either side leading to roundabout with sufficient gap e.g. 20m to prompt users to change lane if required. To lead onto shared space solution such as coloured surface with road markings removed. Corners of roundabout should be tightened alongside
Cribbs Causeway: Trench lane						Narrow road width of approximately 6m with 2m paths either side to retro fitted crash barriers.	As part of development access improvements that include new 5m wide cycle and pedestrian route alongside road widening to 6.5m for two buses to pass.

Almondsbury Business Park

Overview

- Distance: 2.0 kilometres (from centre of Woodlands site)
- Cycling time: 10 minutes
- Hilliness: no significant change in level

There are on carriageway advisory cycle lanes over most to the length of Woodlands Lane, either on one side of the road or the other, so that provision is interrupted at several points for a user in either direction.

While the lanes assist, particular where the road rises slightly, the volume of traffic on Woodlands Road would argue for a segregated provision.

This recommendation is therefore for a shared use footway on the south side of Woodlands Lane where it can be a continuous provision, crossing to the north side approaching the junction with Bradley Stoke Way.

Critical issues

(Refer to route description)

The following points are considered to be critical to the achievement of the entire route.

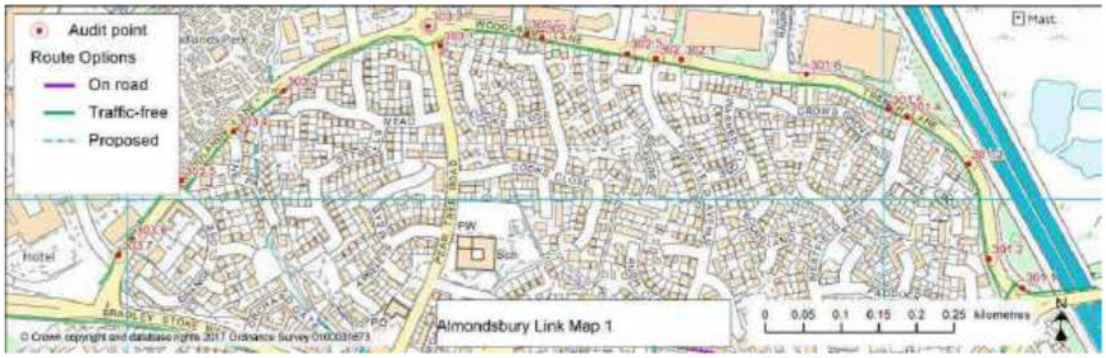
301.2 The Armco barriers at the top of the slope would require relocation which may present engineering difficulties.

Deliverability

All works within highway boundaries.

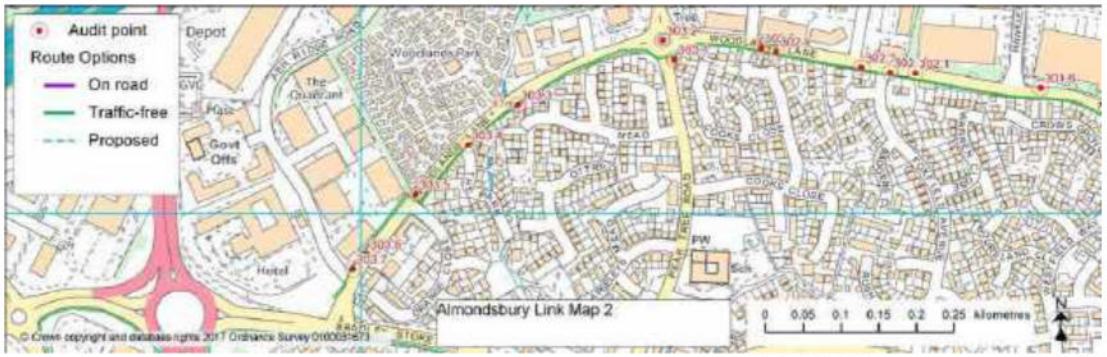


Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
	301	1			Vehicle volume, Vehicle speed, Width	Trench Lane and Woodlands Lane is single carriageway 7 m wide. There are advisory cycle lanes 1 m wide intermittently on one side of road only. Lane alternates between sides.	Vehicle volume wood require segregated facility. This would ideally be on the north side of the road to link to the business park entrances, however highway width is not available, so the south side of the road is preferred.
Almondsbury Link, Woodlands Lane	301	2			Vehicle volume, Vehicle speed, Width	Vehicle speeds and volume indicate segregated pathway	Increase width of footway to 3 m setback Armco barrier relocate lamp standards. Path to be set at rear of bus stop with increased total path width
Almondsbury link, Woodlands Lane	301	3			Vehicle volume, Vehicle speed	See above	Path set behind lamp standards 2m wide to avoid in need to relocate standards
Almondsbury link, Westfield Way	301	4			Vehicle volume, Vehicle speed, Layout, Crossing	Crossing of Westfield way Path is narrow on west side due to garden hedge and utility box at back of footway	Cycle priority across Junction Accept reduced width at pinch point by utility box



Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
Almondsbury link	301	5			Vehicle volume, Vehicle speed	Bus stop	Set new path at rear of bus stop
Almondsbury link Hawkley Drive crossing	301	6			Crossing, Vehicle speed, Vehicle volume	Crossing required for access to Hawkley Drive	Use existing informal crossing point Footway on north side could be readily widened into carriageway subject to drainage gullies to achieve 3m width to give a direct access to Hawkley Drive Widen brick paviour surface to link to the estate road with 10 mph limit Repair to services cover required Footway subsidence should also be repaired
Almondsbury link	302	1			Layout, Vehicle volume, Vehicle speed	Restricted width on footway across residential frontage 2 m width only Bus stop on footway	Not practical to widen path in front of residence New path to rear of bus stop may require removal of small ornamental tree
Almondsbury link Foxfield Avenue	302	2			Crossing	Crossing of side road	Cycle priority crossing
Brislington:Stockwood Road	302	2			Layout, Width	Continuation of residential 20mph street.	Widen and resurface existing paths. Treat three crossing points with coloured surfacing and bicycle symbols.
Almondsbury link Woodlands	302	3			Crossing	Crossing of Woodlands Lane required to Woodlands Estate	No existing crossing Options could be crossing from shared use footway directly to Woodlands access road, or crossing to East of Woodlands and creation of a shared use path on north side of Road for short distance to link to Woodlands.
Brislington:Stockwood Road	302	3			Layout, Width	Bus stop beside local shops.	Continue path along paved area with anti-slip paint and bicycle markings to differentiate to other users.
Almondsbury link, Woodlands Lane	302	4			Layout, Vehicle volume, Vehicle speed	Bus stop restricts available width. Lamp standard and litter bin also obstruct rear of bus stop	Approx 2m width between wall and bus stop sufficient for path relocate litter bin. Limited width accepted for short length.

Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
Almondsbury link Eagles wood	302	5			Vehicle volume, Vehicle speed, Crossing	No existing crossing of Woodlands Lane from South to North to reach Eagles Wood	Best option is probably a crossing from footway straight to Eagles Wood access road
Almondsbury link Pear Tree Road	303	1			Vehicle speed, Crossing, Vehicle volume	Crossing of Pear Tree Road side Junction at roundabout Vehicles leaving roundabout in to Pear Tree Road at speed	Suggest raised table for crossing
Almondsbury Link Pear Tree roundabout	303	2			Crossing	Splitter islands on Woodlands Lane approaches to roundabout	Widen footway on north side of Woodlands Lane at crossings of approach road to link to Great Park Road for access to business park



Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
Almondsbury link Woodlands Park	303	3			Vehicle volume, Vehicle speed	As above	Increase width of footway to rear Divert path to rear of bus stop
Almondsbury link The Park	303	4			Vehicle speed, Vehicle volume, Crossing	Crossing of side road The Park	Cycle priority crossing
Almondsbury link Grange Close	303	5			Vehicle speed, Vehicle volume, Crossing	Continuation of shared use footway on south side is obstructed by bus stop and very narrow available width	Suggestion cross Woodlands Lane to north side at Grange Close No formal Crossing required but crossing should be delineated on surface
Almondsbury link Ash Ridge Road	303	6			Vehicle volume, Vehicle speed	As above	Widen existing footway to 3m within highway boundary to link to Ashridge Road Relocating lamp standards may not be practicable but would ideally be moved to rear of path.
Almondsbury link Ash Ridge Road	303	7			Vehicle volume, Vehicle speed, Crossing	Crossing of side road	Cycle priority crossing links to existing shared use footway

Filton North Link

Concorde to Filton (Rolls Royce)

Overview

- Distance: 4.9 kilometres (from centre of Woodlands site)
- Cycling time: 15 minutes
- Hilliness: no significant change in level

The route largely follows an existing signed route which is mostly traffic free on shared use footways and traffic free paths.

Critical issues

(Refer to route description)

The following points are considered to be critical to the achievement of the entire route.

401.5 Railway underbridge widening on Gypsy Patch Lane.

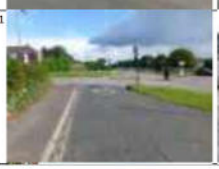
Deliverability

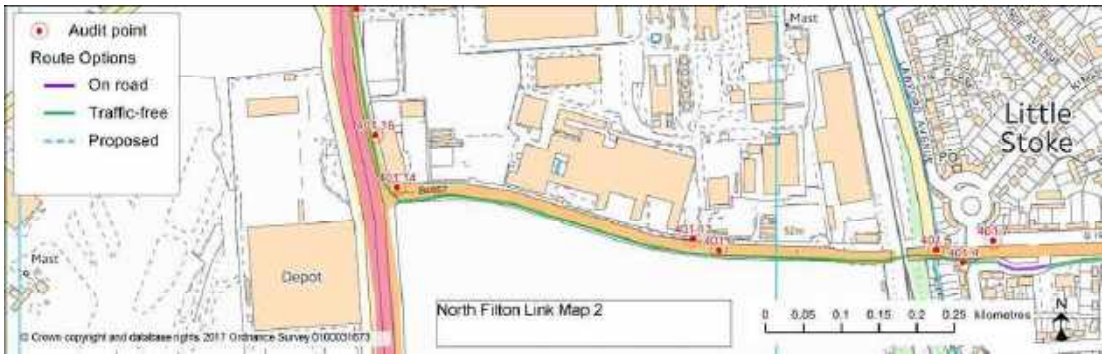
Third party land permissions would be required to deliver:

401.5 Widening is proposed by Metrobus; permissions will be delivered by Metrobus.

Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
North Filton Link Hatchet Road Crossing						junction over single lane south bound, two lanes north bound Splitter island provides adequate width for refuge	Proposals for Metrobus extension include lane markings which will assist crossing pedestrians and cyclists
North Filton Link Gypsy Patch Lane						pedestrian footway Low upstand kerb to footway No priority at junctions	Raised table or other priority through crossing of junction with Bush Avenue
North Filton Link Gipsy Patch Lane westbound						Overgrown by vegetation originally good width of 2 metres (cycleway)	Vegetation management Proposal for west bound cyclists to use existing service roads and dedicated cycle tracks parallel to Gypsy Patch Lane
North Filton Link Gipsy Patch Lane westbound						Approach to Bridge carrying railway on shared use footway	Widen footway to 3 m shared use



Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
North Filton Link Gypsy Patch Lane railway bridge	401	5			Width, Vehicle volume, Vehicle speed	Road very narrow under Bridge Width for two cars to pass but not a bus and car Footway width less than 1 metre	Metrobus extension proposes new widened bridge under railway comprising shared use footways both sides; bus lanes in both directions; two lanes of general traffic. Proposed that westbound cyclists have option of using shared use footway or bus lane.
North Filton Link Gypsy Patch Lane westbound	401	6			Vehicle volume, Vehicle speed	Existing or proposed by Metrobus on carriageway bus lane and cycle lane. Shared use footway crosses access road at light controlled crossing	Cyclists may use either shared use footway or proposed bus lane
North Filton Link Gypsy Patch Lane	401	7			Layout	Route uses service road parallel to Gipsy Patch Lane on north side. Access to houses mirrored on both sides of Gypsy Patch Lane	Option for eastbound cyclists to use shared use footway combined with service road, or metrobus lane (proposed).
North Filton Link Gypsy Patch Lane (eastbound)	401	8			Layout	Unnecessary barrier	Widen opening between the adjacent roads to minim um 1.5 m and remove low barrier.
North Filton Link Gypsy Patch Lane crossing	401	9			Crossing	Eastbound bound cyclists have option to cross to opposite side of Gipsy Patch Lane to link to North / South route Woodlands to City Two stage crossing	Single stage light control. Induction loops to detect approaching cycles
North Filton Link Gypsy Patch Lane (Eastbound)	401	11			Crossing	Little Stoke Lane No crossing facility	Introduction of shared use path on north side would benefit from priority crossing


Audit point
Route Options
On road
Traffic-free
Proposed
Mast
Depot
Mast
Little Stoke
PO
North Filton Link Map 2
0 0.05 0.1 0.15 0.2 0.25 kilometres
N
© Crown copyright and database rights 2017 Ordnance Survey 0100031673

Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
North Filton Link Gypsy Patch Lane (Eastbound)					volume, Vehicle speed	Shared use path on north side ends at toucan crossing of Gypsy Patch Lane	Metrowest proposal includes no cycle facility on north side of Gypsy Patch Lane east of Little Stoke Lane. Increase width of footway to 3 m for shared use Links to crossing of Orpheus Avenue to join North/South route
North Filton Link Gypsy Patch Lane roundabout at Rolls-Royce Gate 5					Vehicle speed, Layout	Cycle lanes (non-mandatory) stop short of roundabout.	Carry shared use footway through access to Rolls Royce Gate 5 with priority crossing on raised table
North Filton Link Gypsy Patch Lane Junction A38 Rolls-Royce					Vehicle speed, Layout	Shared use path Gypsy Patch Lane and A38 link to Rolls Royce Non mandatory cycle lanes gypsy Patch Lane	Westbound cyclists have the option of using cycle lanes on carriageway and the right turn filter to the garage to access the shared use path on the north side of Gypsy Patch Lane, or using the shared use footway on the south side and crossing at the light controlled crossing at the junction
North Filton Link A38 slip to Gipsy Patch Lane						shared use footway Footway serves as link to Rolls Royce main gates	Rationalise signage to remove obstructions
North Filton Link A38 Rolls-Royce entrance Gate 1						A38 cluttered by Street furniture crosses two accesses	Rationalise street furniture to remove obstructions

UWE Link

Parkway Station to UWE Campus

Overview

- Distance: 5 kilometres (from centre of Woodlands site)
- Cycling time: 15 minutes
- Hilliness: no significant change in level. Slight ascent / descent on A4174

The route largely follows an existing signed route which is mostly traffic free on shared use footways and traffic free paths.

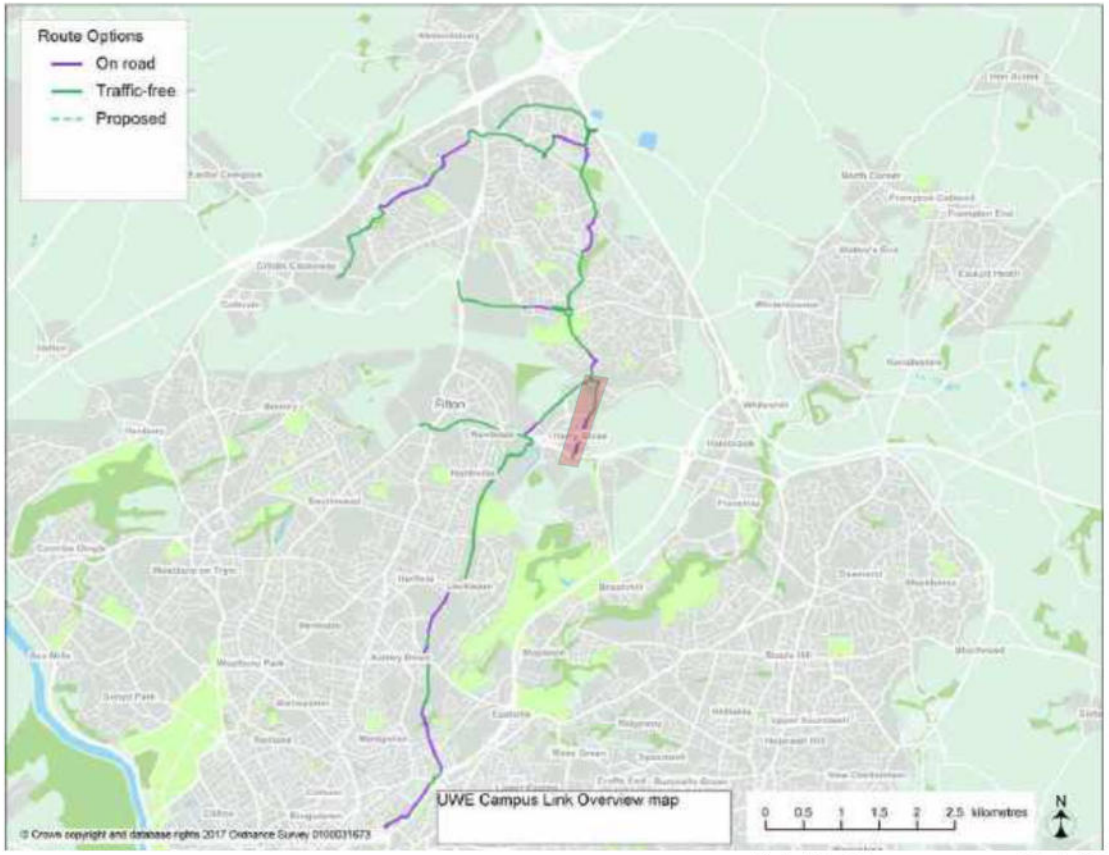
Critical issues

(Refer to route description)

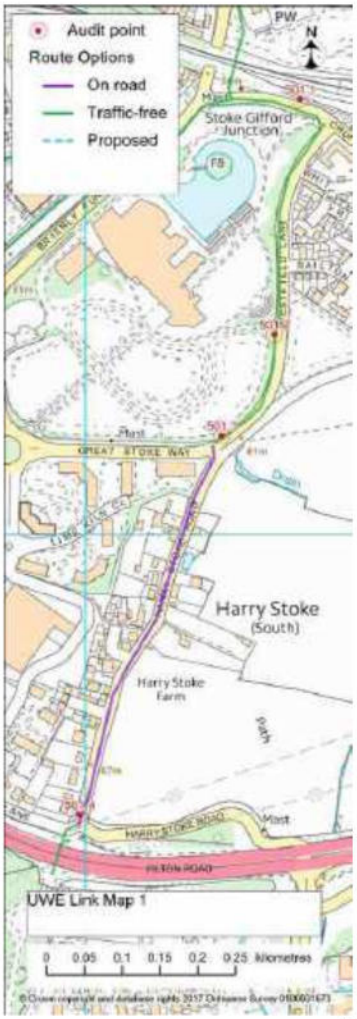
There are no critical issues on this route

Deliverability

There is no third party land required.



Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
UWE Campus Link, Church Road,	501	1			Layout, Width, Land	Shared use path at corner on Church Road by roundabout. Path narrow and sight lines obscured giving rise to risk of conflict	Change configuration at junction. Widen footway at pinch point and remove street furniture. Cut back vegetation Resurface path.
UWE Campus link, Church Road	501	2			Layout	Vegetation obstructs sightlines at entrance to Aviva	Clear vegetation back to improve sight lines
UWE Campus link, Church Road junction Harry Stoke Lane	501	3			Crossing	Designated Crossing no light control on quiet road Harry Stoke Lane not accessible to motors. No through road except cycles sign.	Consider raised table at crossing to reduce traffic speeds
UWE Campus link, Harry Stoke Lane Filton Lane Junction	501	4			Crossing	Informal crossings avoids need to negotiate roundabout	Consider raised table at Crossing of Filton Lane and south end of Harry Stoke Lane to ease crossing.



Filton South Link

Filton Abbey Wood to Filton (Airbus)

Overview

• Distance: 6.4 kilometres (from centre of Woodlands site)

• Cycling time: 20 minutes

• Hilliness: no significant change in level

The route largely follows an existing signed route which is mostly traffic free on shared use footways and traffic free paths.

Critical issues

(Refer to route description)

The following points are considered to be critical to the achievement of the entire route.

601.7 Creation of safe crossing of A38 at A4174 junction.

Deliverability

There is no third party land required.



Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
South Filton link Abbey Wood Concorde Way Junction					Land	Street furniture: sign posts, lamp standards, services boxes etc clutter section of path	Short section of path adjacent to Next store could be re-aligned depending on acquiring land in private ownership and moving young trees. Alternatively and probably more expensive: moving a BT (?) box.
South Filton link main line railway bridge						footway narrow including western approach. Minimum effective width 1.5 metre	Only possible intervention would involve closure of one lane of road Not considered feasible. Accept current provision
South Filton link Crossing of Emma Chris Way						controlled junction	Cycle priority a possibility
South Filton link Filton Avenue junction						Informal crossing at light controlled junction	Appears to function as informal crossing and would not be improved by added control.





Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
South Filton link Station Road	601	5			Layout, Width	Short narrow section of ramp. with cyclists dismount warns of subway. Narrow contorted layout of access at foot of ramp	Would be major expense to rearrange access, and entail loss of private car parking. Other Solutions may be available across private car park. Accept short section of poor layout if no alternative arrrangement available.
South Filton link Shellard Road crossing	601	6			Crossing	Cyclists give way to traffic	Very quiet road. Cycle priority would offer minimal advantage, and may take cyclists off desire line to cross at appropriate location.
South Filton link A38 crossing	601	7			Crossing, Vehicle speed, Vehicle volume	Crossing of A38 is on desire line between Filton Abbey Wood and British Aerospace shared use footway continue route either side of A38 Southern arm of A38 roundabout is only arm without light control. Toucan crossing is located 225 m south of roundabout.	Review use of existing toucan to south, and consider relocating to roundabout approach.

Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
South Filton link Southmead Road Concorde Lodge entrance	601	8			Crossing	No priority across entrance	Cycle and pedestrian priority crossing
South Filton link Southmead Road	601	9			Width	Narrow section of footway on shared use path	Widen footway for shared use
South Filton link Southmead Road	601	11			Crossing	Pelican crossing at junction of Southmead Road and Golf Course Lane and entrance to British Aerospace	Upgrade to toucan

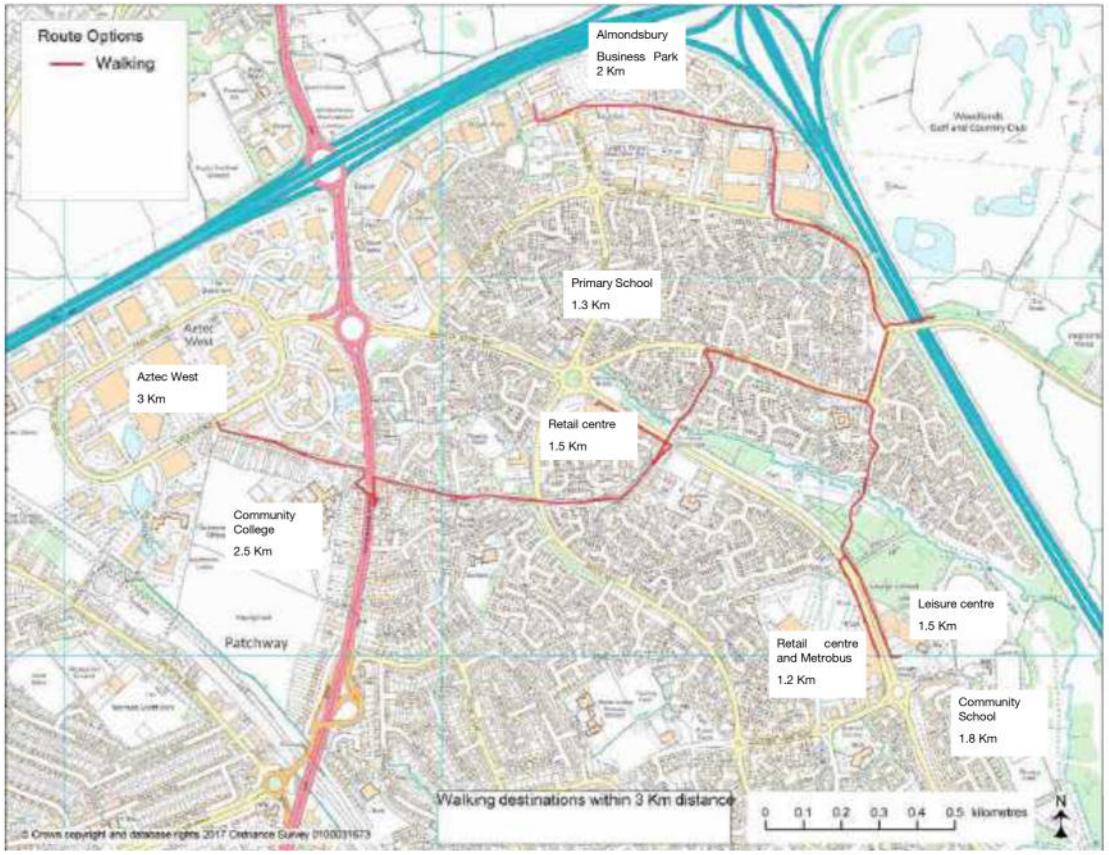
Route description	ID		Photo 1	Photo 2	Barriers	Description	Intervention
South Filton Link option	602	1			Layout, Land	Potential link to Airbus gate on Gloucester Road.	A minor re-arrangement of car parking spaces, signage and surfacing would open the car park to cycling linking to Church Road.
South Filton Link Option	602	2			Other	Church Street is one way for vehicles westwards towards Gloucester Road.	Introduce two way movement on Church Road (Cycle contra flow) to create link in both directions serving existing toucan crossing on Gloucester Road to Airbus entrance.

Woodlands Park, walking strategy

Introduction

New developments provide an opportunity to design both buildings and route networks to provide accessibility and advantage to walking and cycling and can overcome many of the difficulties that can be encountered when retro-fitting traffic free routes in urban areas. Key points are:

- routes for walking should be more direct than equivalent connections for private vehicles. This may be achieved by the filtered permeability techniques described in Sustrans guidance. Wherever practicable, routes for cyclists and pedestrians should have priority over private vehicles
- development block size should be small enough to provide a high degree of route choice and minimise detour. Layouts which accommodate a grid or lattice route network are legible and can create good permeability for walking. The aim should be to provide a 'mesh width' of no more than 250m: this may require routes to run through larger development plots such as supermarket sites.
- personal security concerns can be a strong deterrent to walking. Land-use type and building orientation in relation to traffic free routes should provide natural surveillance, and public spaces should encourage social activity adjacent to routes. A choice of routes is beneficial and places of concealment such as sharp corners and excessive planting need to be avoided. Routes away from buildings should be lit to minimise personal security concerns
- on sloping sites, development layouts should enable roads and traffic free routes to minimise steep gradients
- development massing should provide direct sunlight on walking routes wherever possible and minimise wind funnel effects.
- mixed use developments should plan for a very high proportion of internal trips to be made on foot



or by cycle.

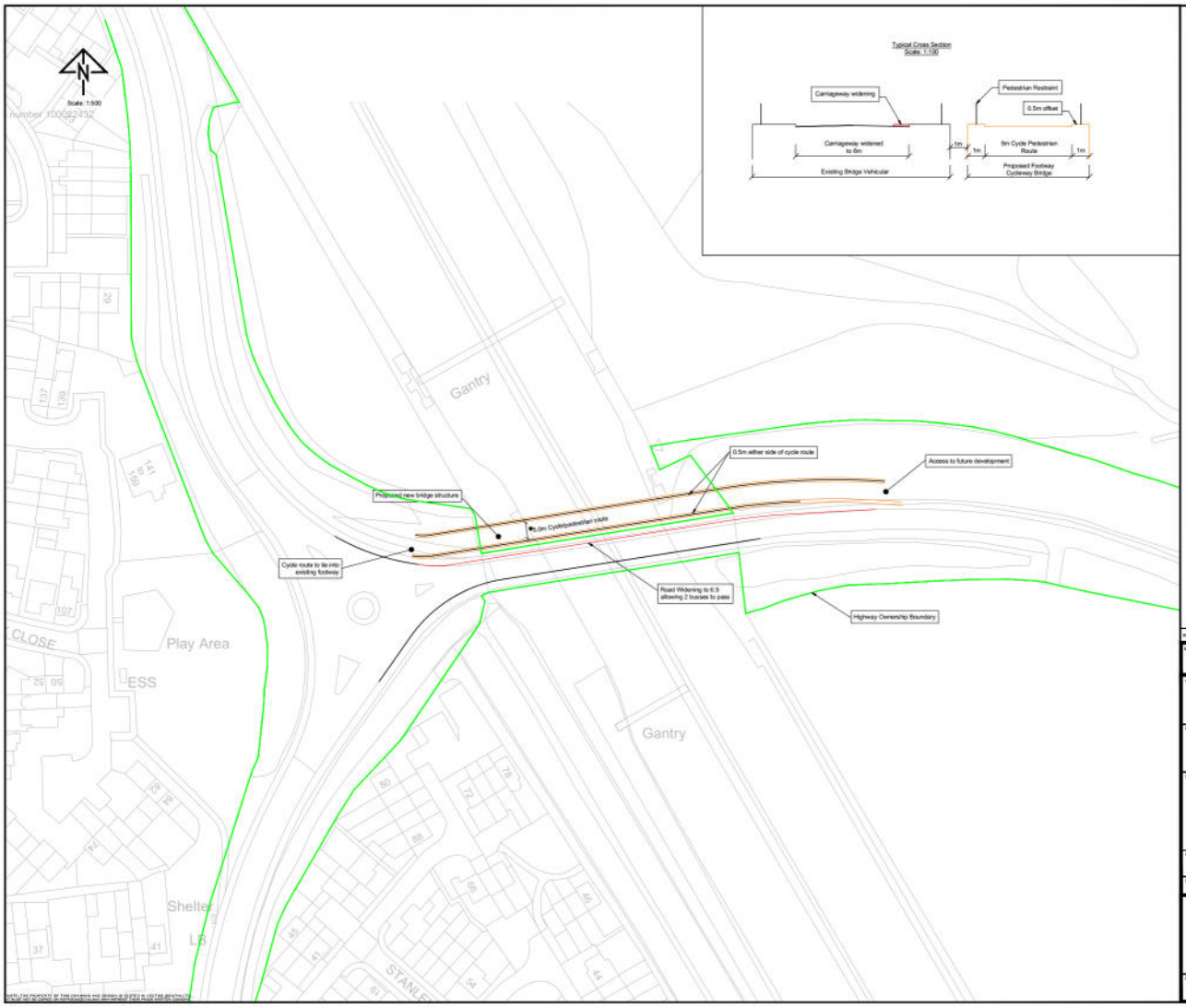
Access to local destinations on foot

The walking map shows a number of local destinations, both employment sites and other local facilities which can be reached within 30 minutes' walk. Local primary secondary and further education are all within walking distance, as are the main retail centres and the leisure centre.

The routes shown are indicative only, to demonstrate the relative accessibility of local destinations.. The nature of the journey on foot allows ample variation by the individual according to their own preferences.

All of the routes indicated are in place.

DRAWINGS



INFORMATION ONLY

Grass Roots Planning

Woodland Golf Course

Cycle Route & Carriageway Widening

AS SHOWN @ A1

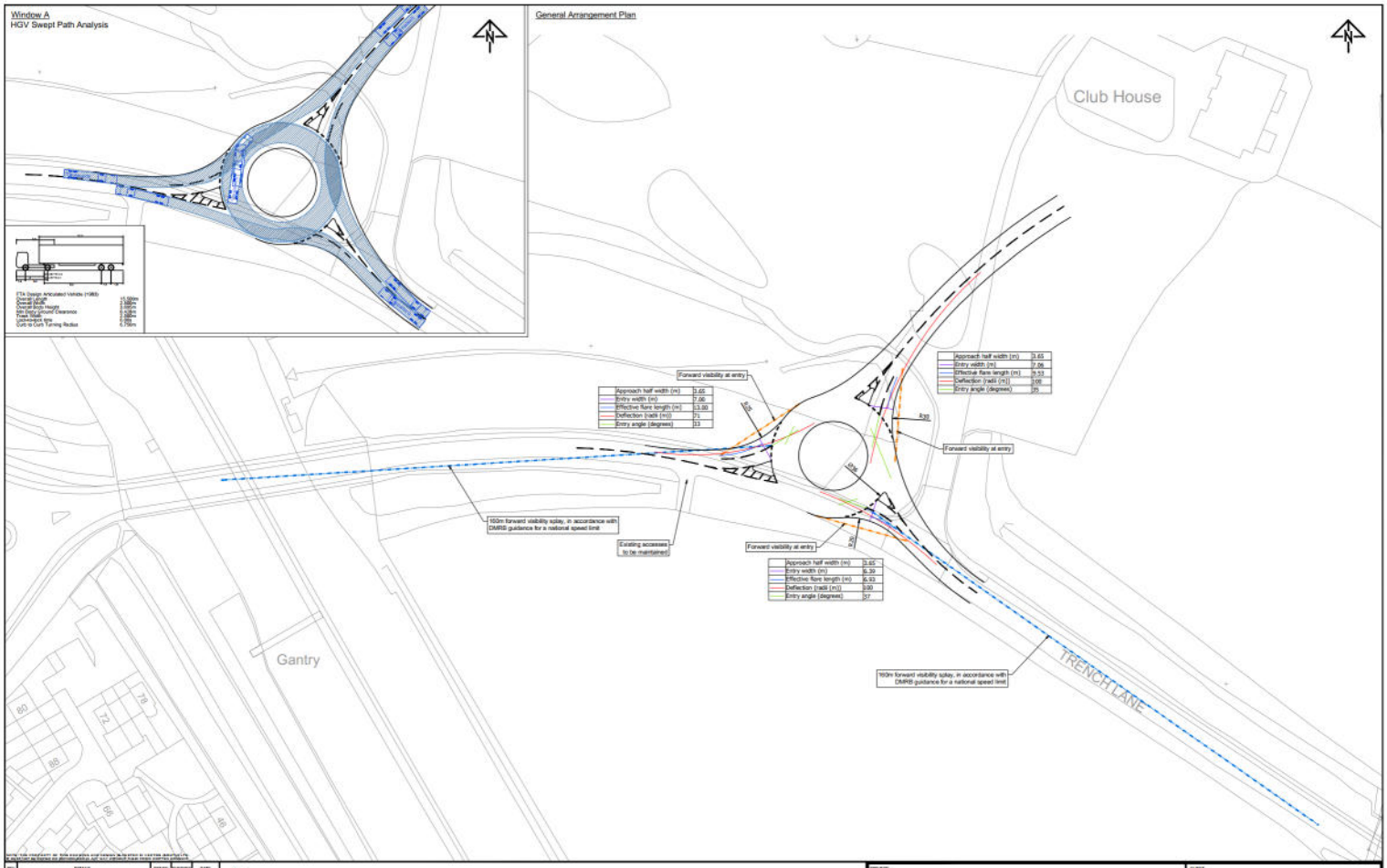
AB | AD | 07/2017

vectos transport planning specialists

Broad Quay House, Prince Street, Bristol, BS1 4DJ
t: 0117 905 8858 e: enquiries@vectos.co.uk

162451-GA-01

-



REV	DETAILS	DRAWN	CHECKED	DATE
-	-	-	-	-

STATUS: INFORMATION ONLY

Notes

1. All information is indicative only and subject to change at a later stage.

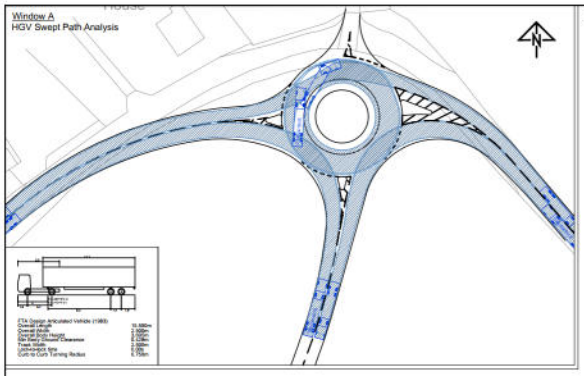
PROJECT: Woodland Golf Course

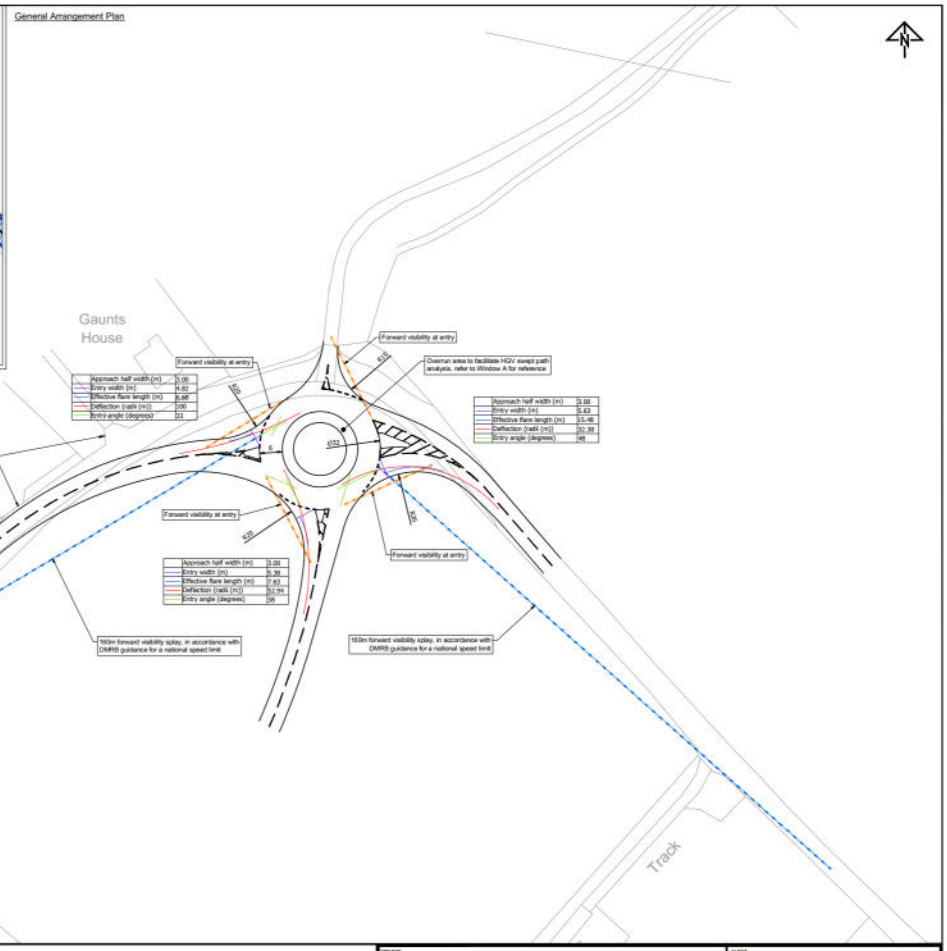
CLIENT: Grassroots Planning

Southern Access Arrangement
Option 1

vectos transport planning specialists
Broad Quay House, Prince Street, Bristol, BS1 4DJ
t: 0117 905 8888 e: enquiries@vectos.co.uk

DRAWN	CHECKED	DATE	SCALE	DRAWING NUMBER	REVISION
JH	JH	03/07/2017	1:500 @ A1	162451_PHL_06	-





REV	DETAILS	DRAWN	CHECKED	DATE
-	-	-	-	-

STATUS: INFORMATION ONLY

Notes

1. All information is indicative only and subject to change at a later stage.

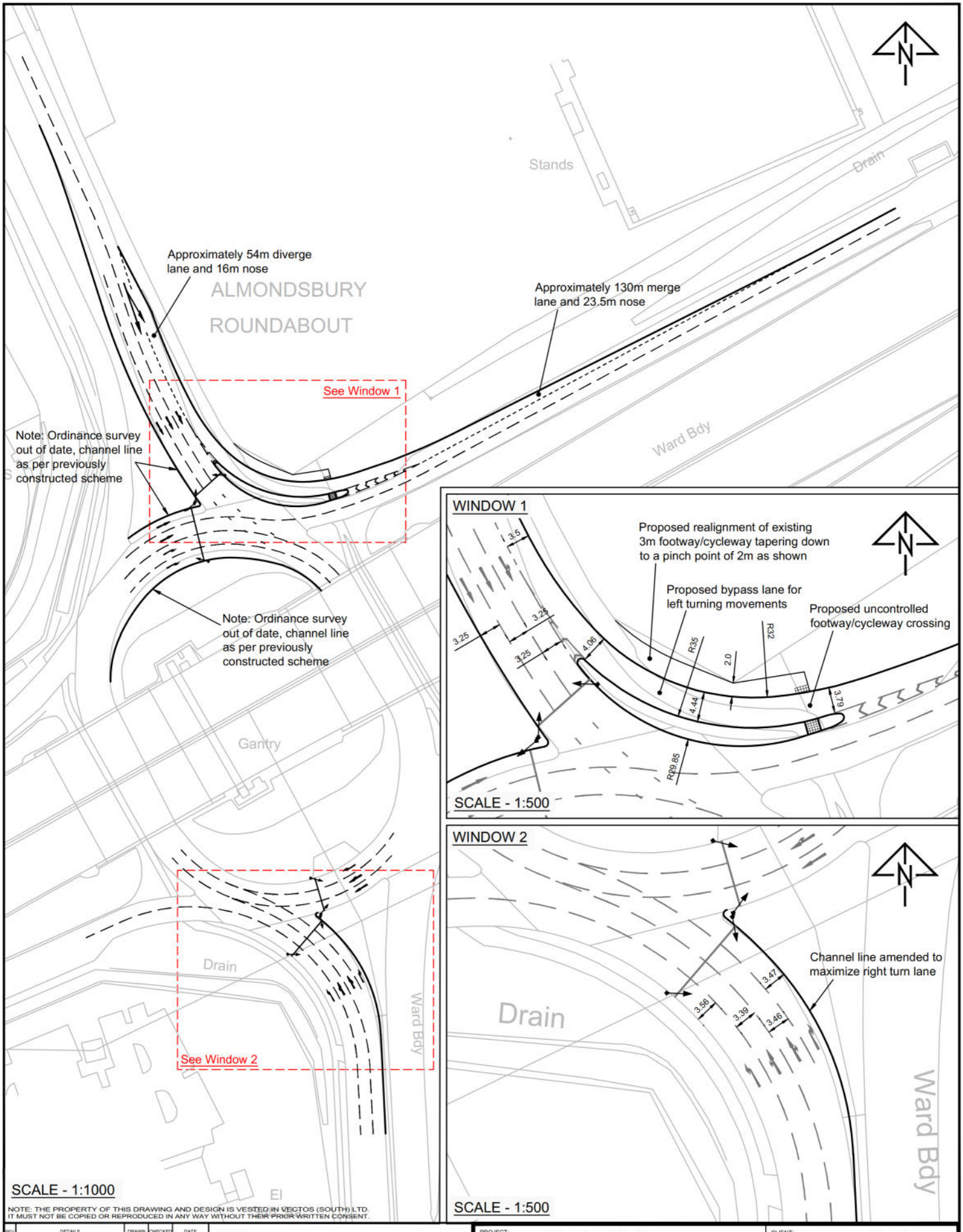
PROJECT: Woodland Golf Course

CLIENT: Grassroots Planning

Northern Access Arrangement
Option 1

vectos transport planning specialists
Broad Quay House, Prince Street, Bristol, BS1 4DJ
t: 0117 905 8888 e: enquiries@vectos.co.uk

DRAWN	CHECKED	DATE	SCALE	DRAWING NUMBER	REVISION
BJB	JH	03/07/2017	1:500 @ A1	162451_PHL_05	-



NOTE: THE PROPERTY OF THIS DRAWING AND DESIGN IS VESTED IN VECTOS (SOUTH) LTD. IT MUST NOT BE COPIED OR REPRODUCED IN ANY WAY WITHOUT THEIR PRIOR WRITTEN CONSENT.

REV	DETAILS	DRAWN	CHECKED	DATE
-	-	-	-	-

STATUS: INFORMATION ONLY

Note:
1. Highway improvement have been carried out to the junction previously and therefore the Ordinance Survey is out of date.
2. All proposed information shown is indicatively only and subject to confirmation at a more detailed stage

PROJECT: Woodland Golf Course

CLIENT: Grassroots Planning

DRAWING TITLE: M5 Junction 16 Indicative Highway Improvements

vectos transport planning specialists
Broad Quay House, Prince Street, Bristol, BS1 4DJ
t: 0117 905 8888 e: enquiries@vectos.co.uk

DRAWN:	CHECKED:	DATE:	SCALES:	DRAWING NUMBER:	REVISION:
JH	DR	07/2017	As shown @ A3	162451-PHL-09	-

Woodlands Golf Club

Transport Study Addendum

Date: 08/01/2018

Introduction

1. This Technical Note has been prepared to assess the cumulative traffic impact of the Woodlands site taking into account the West of England (WoE) Joint Spatial Plan (JSP) draft allocation sites to the north of Bristol. This note supplements the Vectos Transport Study (VTS) prepared in August 2017 and should be considered in the context of the VTS, the Joint Spatial Plan (JSP) and the Joint Transport Study (JTS).
2. The modelling work contained within the VTS was prepared to compare the transport impact of the Woodlands and Buckover developments. This note has been prepared to consider the transport impact of the delivery of the Woodlands scheme over and above all draft allocations north of Bristol (See Table 1) in the event that it is decided that additional housing growth in the area is required and both sites are required to deliver this.

Committed Development

Sites

3. The draft JSP was published in December 2017 and is currently progressing through the formal consultation process. For the purpose of this assessment the following sites have been included within this assessment work. The developments as set out within Table represents the level of development to be delivered within the plan period as set out within the Draft JSP. With regards to the Buckover site, it is expected that this could deliver 3,000 dwellings in total with at least 1,500 delivered within the plan period. This assessment has assumed 2,000 dwellings at Buckover so that it is consistent with the VTS as Buckover was originally a draft allocation for circa 2,000 dwellings

Table 1: Draft JSP sites and Woodlands

		Buckover	Charfield	Coalpit Heath	Yate	Thornbury	Woodlands
Dwellings	Houses (within Plan Period)	2,000	1,200	1,800	1,000	500	2,000
FE	Primary School		1.5	2	1		1
	Secondary School						
HA	Employment		5	5	30	5	
	Local Centre			Y	Y	Y	Y

Trip Generation

4. A traffic generation forecast has been calculated for the above sites based on residential and education trip rates as per the VTS. Employment trip rates have been calculated through taking an average trip rate from the TRICS database for B1, B2 and B8 land uses. In order to convert employment area presented in hectares (HA) to SQM it is assumed that each HA provides 5,000 (GFA) of employment floorspace. The employment TRICS outputs are provided at **Appendix A**.

5. The traffic generation associated with the above schemes have been refined to take into account the internalisation of trips within these sites. The level of internalisation is as per the assumptions made with regards to the Woodlands and Buckover sites contained within the VTS. For clarity the following discounts are applied to the traffic generation figures:

   - Residential to / from Shops / Leisure: 20% discount;
   - Employment trips: 10% discount;
   - Primary Education trips: 80% discount.

6. Further discount has been applied to take into account personalised travel planning which ranges from site to site based on their level of accessibility and proximity to key destinations.

7. Details of the trip generation forecast are set out in Table 2 to 5 below and at **Appendix B**. The traffic generation associated with the Woodlands and Buckover sites are as per the VTS.

Table 2: Net External Traffic Generation Associated with Thornbury Draft Allocation*

	0800 to 0900			1700 to 1800		
	IN	OUT	TOT	IN	OUT	TOT
Resi and Edu	51	140	191	125	71	196
Employment	13	4	16	2	11	13
TOTAL	64	144	207	127	82	209

**Inclusive of internalisation and discount associated with Personalised Travel Planning (8%)*

Table 3: Net External Traffic Generation Associated with Yate Draft Allocation*

	0800 to 0900			1700 to 1800		
	IN	OUT	TOT	IN	OUT	TOT
Resi and Edu	65	256	320	247	132	379
Employment	77	21	98	12	66	78
TOTAL	141	277	419	259	198	457

**Inclusive of internalisation and discount associated with Personalised Travel Planning (8%)*

Table 4: Net External Traffic Generation Associated with Coalpit Heath Draft Allocation*

	0800 to 0900			1700 to 1800		
	IN	OUT	TOT	IN	OUT	TOT
Resi and Edu	118	440	558	426	239	665
Employment	12	3	16	2	11	12
TOTAL	131	443	574	428	249	677

**Inclusive of internalisation and discount associated with Personalised Travel Planning (12%)*

Table 5: Net External Traffic Generation Associated with Charfield Draft Allocation**

	0800 to 0900			1700 to 1800		
	IN	OUT	TOT	IN	OUT	TOT
Resi and Edu	82	334	417	326	176	502
Employment	77	21	98	12	66	78
TOTAL	159	356	515	338	242	580

**Inclusive of internalisation and discount associated with Personalised Travel Planning (8%)*
***Residential Trip rates increased by 10% to reflect unsustainable location*

Traffic Distribution

8. The distribution of the residential and education elements of the draft JSP schemes have been calculated as per the methodology used within the VTS. However, appropriate and representative Census Output Areas have been used for the sites respectively. This method is based on the residential population.

9. With regards to the distribution of employment trips a similar methodology to the above, and as per the VTS, has been used. However, the daytime population has been used.

10. Details of the distribution calculation is provided at **Appendix C**.

TEMPRO Growth

11. The initial modelling work prepared for the VTS included the application of a blanket TEMPRO growth across the network plus the addition of traffic associated with the Woodlands and Buckover schemes.

12. This method has been revised to enable a more realistic assessment and which doesn't include a substantial element of double counting. For the purpose of this additional study the TEMPRO growth factors have been revised down to ensure that traffic associated with JSP sites are not double counted.

13. Notwithstanding the above, consideration needs to be given to the overarching principles and vision of the JSP and JTS

14. Figure 12.2 of the JTS, as show below, outlines the forecast differences in commuting between 2011 and 2036. It is estimated that there will be a 28% rise in trips by all modes in the West of England; this is shown below by the increase from 529,000 to 673,000 trips. However, the vision considered a shift away from the private car to more sustainable modes of travel. The vison confirms that whilst the number of tips would increase, the number of vehicle trips will in fact decrease.



15. From Figure 12.2 above, it can be calculated that in 2011, there will be an estimated 317,400 vehicular trips. In 2036, there will be an estimated 309,580 vehicular trips; this equates to a reduction of 7,820 vehicular trips (equivalent of 2.5%) over the 25-year period. The application of any TEMPRO Growth to the network (as per this assessment work) therefore ensures an extremely robust assessment and presents an absolute worst case scenario for assessment.

16. It is stated within the JTS that the reasons for the decrease in car trips include:

Future numbers of people driving will depend on the scale of shift to other modes and, increasingly, the adoption of new models of car ownership. People are increasingly choosing to avoid buying cars and instead use car clubs and other forms of mobility as a service. Furthermore, measures to introduce congestion charging in urban centres will significantly affect travel choices.

The largest shifts from driving to walking, cycling and public transport will take place in the Bristol urban area, which will reflect the ability to make journeys using different travel options.

17. The Transport Vision study acknowledges that to reduce traffic delays, high levels of mode shift in the urban areas is required. This includes the future management of road space on radial routes into Bristol.

18. In light of the above, the development at Woodlands is likely to deliver a higher shift away from the private car than what the West of England area would experience in totality. For example, the JSP seeks to increase the proportion of walking and cycling trips by 30% (6% points) over a 25 year period. However, SUSTRANS have reported (based on evidence) that there has been an increase of 85% in cycling trip alone in a 7 year period (2008 to 2015). We are therefore of the opinion that the Woodlands scheme alongside the SUSTRANS cycling strategy as appended to the VTS can deliver an even greater shift away from the private car, not only for the Woodland's scheme but also Bristol urban area as a whole. This has not been quantified within this assessment work and therefore results in a robust assessment.

Modelling Assessment

19. Further analysis of the VTS VISSIM model has been undertaken to consider the overall impact of the draft JSP sites per Table 1 as well as the Woodlands development. The assessment will focus on the overall impact of the Woodlands development on the network against a baseline scenario of 2036 plus the presence of draft JSP site traffic on the network (and TEMPRO growth). The assessment takes into account the key model outputs of overall network performance which is represented in overall delay and journey speed across the network. Further analysis of impacts on queue length and delay is included.
20. The full model results are provided at **Appendix D**.
21. Three scenarios have been modelled, as follows:

    - Scenario 1: 2017 Base
    - Scenario 2: 2036 Base + Draft JSP Allocation + TEMPRO growth
    - Scenario 3: 2036 Base + Draft JSP Allocation + TEMPRO growth + Woodlands Traffic

22. It should be noted that the with the Woodlands development scenario the road network has been updated within the model to include the Spine Road through the site which connects Hortham Lane with Trench Lane.
23. The detailed VISSIM model runs have been optimised so as to present the best overall network performance in each scenario assessed. This provides a like for like comparison of the impact of the Woodlands development. This assessment is robust because:

    - TEMPRO growth has been applied to Background traffic whist the JSP states that traffic flows would reduce 2.5% by 2036;
    - The modelling work does not account for any mitigation associated with the Woodlands scheme or the JSP;
    - Traffic associated with the current Woodlands site operations has not been removed from the network, therefore Woodlands development traffic has been overestimated by 136 vehicles during the AM peak hour and 118 during the PM peak hour.

Network Performance

24. Table 6 provides a summary of the traffic impact of the Woodlands scheme in Delay terms, whilst Table 7 summarises the impact in vehicle speed terms when comparing scenario's 2 and 3.

Table 6: Delay across the Network

Delay Across the Network				
	Scenario 1	**Scenario 2**	**Scenario 3**	**Impact**
	2017 Base	**2036 Base + Draft Allocation (plus TEMPRO* Growth)**	**Scenario 2 + Woodlands**	
AM Peak (0800 to 0900)	106	164	189	+25 Seconds
PM Peak (1700 to 1800)	71	288	320	+32 Seconds

**TEMPRO Growth Revised to remove any double counting of traffic*

Table 7: Average Journey Speed across the Network

Average Journey Speed across the network				
	Scenario 1	**Scenario 2**	**Scenario 3**	**Impact**
	2017 Base	**2036 Base + Draft Allocation (plus TEMPRO* Growth)**	**Scenario 2 + Woodlands**	
AM Peak (0800 to 0900)	20	18	18	0 mph
PM Peak (1700 to 1800)	25	13	12	-1 mph

25. The network study area is centralised around the Woodlands development and does not assess the equivalent localised and concentrated effects immediately surrounding the draft allocation sites or for the West of England as a whole. Therefore, the associated impacts and measured in an area where they will be at their greatest and arguably no greater than or less than any other localised impacts of the draft allocated site.

26. The order of magnitude in change in delay across the network is not considered significant in the context of the NPPF. The impact of the development is considered minimal with increases in delay forecast to be 25 seconds during the AM peak hour and 32 seconds during the PM peak hour. This has a negligible impact on average journey speeds with no reported changes during the AM Peak hour and a reduction of 1mph during the PM peak. This level of impact is negligible.

27. Notwithstanding the above impacts, the overall vision of the JSP and JTS is to maximise the proportion of sustainable trips with a corresponding reduction in car travel. To deliver this vision in the most efficient way means development on appropriate sites which can maximise trips by sustainable modes. The Woodlands site is the most qualified to actually deliver the vision of the JSP and JTS as set out in section 2.33 to 2.5 of the VTS, given its proximity to existing and proposed employment opportunities by foot or by bike which outperforms all draft allocation sites to the north of Bristol.

Journey Time

28. Journey time statistics have been taken from the model output files and is for the routes shown on the plan below.



29. Table 8 provides a summary of the impact of the development in journey times along the routes identified above.

Table 8: Impact on Journey Time

Route	Direction	AM	PM
Route 1	NB	-54	-103
	SB	-21	142
Route 2	EB	21	17
	WB	-266	214

Route 1

30. The development proposal shows a significant improvement to route 1 during the AM peak hour with a reduction in journey time along the northbound (-54 seconds) and southbound (-21 seconds) route during the AM peak hour.

31. During the PM peak hour, the development will reduce the journey time for the northbound route by 103 seconds, however the southbound route would experience an increase of around 142 seconds. This level of delay is experienced on the approach to the M5 along the A38 from the north.

32. This should be considered in the context that the above assessment has been undertaken without the implementation of any mitigation associated with the development and neither has it considered any mitigation associated with the JSP and JTS. It is also based on a very robust assessment methodology as set out in paragraph 21.

Route 2

33. The development will have a minimal impact on journey time along the eastbound route during the AM and PM peak hour which is forecast to experience a modest increase in journey time; by 21 seconds during the AM peak hour and 17 seconds during the PM peak hour. This level of increased delay is not unexpected given its proximity to the Woodlands site and is minimal.

34. With regards to the westbound route the development results in a reduced journey time during the AM peak hour by around 266 seconds providing an overall benefit to this route. During the PM peak hour the westbound journey length is expected to increase by 214 seconds.

35. Further assessment of the model confirms that this delay is experienced from the Woodlands Lane / Bradley Stoke Way junction and along Woodlands Lane itself. The model confirms there is no impact on journey time on the approach to and on the Aztec West junction. The increase in delay is confined to the local highway network rather than the strategic network.

36. The Woodlands traffic generation forecast is robust and does not represent the net change in traffic associated with the site, therefore the assumed Woodlands traffic overestimates traffic by around 136 vehicle movements during the AM peak hour and 118 vehicles over the PM Peak hour. In other words the assessment has not removed the existing Woodlands site traffic from the network. The assessment work also does not account for any reduction in base traffic as a result of committed sustainable access schemes such as the Bristol metrobus or JSP proposed schemes.

37. A robust sustainable access strategy is being developed for the site, which would not only provide a reduction in car travel from the development, but also the residential area of Bradley Stoke which includes around 5000 households. As such the Sustainable Access Strategy would reduce the level of delay experienced along Woodlands Lane and generally within the area. This is primarily focuses on creating high quality cycle networks connecting the Woodlands site to key employment and other destinations. This is set out within the SUSTRANS report as submitted as evidence.

38. It should also be noted that the modelling work does not account for drivers altering the time of travel to before or after the traditional peak hours as modelled. If drivers considered the level of delay to be excessive then they could simply change their travel time to before or after the traditional peak hours. This response is becoming more prevalent with the advent of increased application of flexible working hours.

39. It is therefore considered that a more refined assessment would demonstrate a reduced level of delay along Woodlands Lane. However, this needs to be considered in the context of the impact of the Woodlands scheme on the overall impact on the network which is minimal (Table 6 and 7).

Queue Lengths

40. Tables 9 to 13 shows the queue lengths at key junctions during the AM and PM peak hours. The VISSIM model outlines queue length in metres whilst these have been converted into vehicles (assumed average PCU of 5.75m per PCU) for inclusion within this report.

Table 9: A38/M5 Junction

Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	Impact	2036 Base + CD	2036 Base + CD + Woodlands	Impact
A38 Gloucester Road North	34	28	-6	76	79	3
M5 East	44	50	6	72	84	12
A38 Gloucester Road South	5	5	0	76	75	-1
M5 West	10	18	8	57	47	-9

41. As shown in Table 9, the impact of the development on queueing at the A38 / M5 junction is minimal. The overall impact is an increase of 8 vehicles queuing at this junction during the AM peak hour, whilst the impact during the PM peak equates to 5 additional vehicles queuing.

42. The above is reported prior to the implementation of any mitigation measures and based on an extremely robust assessment methodology.

Table 10: Aztec West Roundabout

Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	Impact	2036 Base + CD	2036 Base + CD + Woodlands	Impact
A38 Gloucester Road North (Ahead/Right)	54	51	-3	2	2	0
A38 Gloucester Road North (Left)	6	8	2	2	2	0
Bradley Stoke Way	21	12	-9	19	15	-4
A38 Gloucester Road South	79	80	1	85	84	0
Park Avenue	1	1	0	35	31	-3

43. As shown in table 10 the proposed development will generally have a positive impact on the level of queuing at the Aztec West roundabout. This is primarily due to the development Spine Road which connects Hortham Lane with Trench Lane and therefore provides an element of relief to any congestion at the Aztec West Roundabout and the general area. The overall impact is a reduction of 9 vehicles queuing at this junction during the AM peak hour, whilst the reduction in queuing would be 7 vehicles during the PM peak hour.

Table 11: Woodlands Lane

Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	Impact	2036 Base + CD	2036 Base + CD + Woodlands	Impact
Woodlands Lane (Right)	54	6	-48	44	71	27
Woodlands Lane (Left)	28	0	-28	33	71	38
Bradley Stoke Way East	4	3	-1	32	17	-15
Bradley Stoke Way West	2	2	0	4	3	0

44. The modelling result show a reduction (77 vehicles) in queueing at the Woodlands Lane Junction during the AM peak hour, whilst the PM peak hour will experience an increase in queuing of 49 vehicles. This increase is experience on the Woodlands Lane approach.

45. An increase in queue length at the Woodland Lane approach corresponds to an increase in delay of 214 seconds between the site access and the Woodlands Lane / Bradley Stoke Way junction.

46. Any increase in queue lengths and delay need to be considered in the context of the impact of the overall network which is minimal. Consideration also needs to be given to the fact that there would be a significant benefit during the AM peak hour and that the modelling work represents a very robust methodology.

Table 12: Pear Tree / Bradley Stoke Way

Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	Impact	2036 Base + CD	2036 Base + CD + Woodlands	Impact
Bradley Stoke Way West	0	0	0	1	1	-1
Pear Tree Road	0	0	0	1	1	-1
Bowsland Way	0	0	0	1	1	0
Bradley Stoke Way East	0	0	0	5	1	-5
Brook Way	1	1	0	10	3	-7

47. As shown in table 12 the proposed development will generally have a positive impact on the level of queuing at the Pear Tree / Bradley Stoke Way roundabout. The overall impact is no change in queueing during the AM peak hour, whilst there will be a reduction in queuing vehicles of 14 vehicles during the PM peak hour.

Table 13: A38 / Hortham Lane

Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	Impact	2036 Base + CD	2036 Base + CD + Woodlands	Impact
A38 Gloucester Road South	2	4	1	15	21	7
A38 Gloucester Road North	51	66	16	52	48	-4
Hortham Lane (Left)	3	12	9	1	2	1
Hortham Lane (Right)	3	12	9	0	2	1

48. As shown in Table 13 the development is forecast to result in an increase in queuing at the A38 Hortham Lane Junction. During the AM peak hour this equates to 45 vehicles whilst the impact during the PM equates to an additional 5 vehicles queueing. This is not unexpected as the development includes a new link connecting Hortham Lane with Trench Lane and therefore additional traffic will be routed via Hortham Lane rather than on the Aztec West and M5 / A38 junction. Whilst the modelling work is forecast to increase queuing at the junction, the journey time assessment confirms that the increase in delay at this junction is minimal.

Summary and Conclusion

49. The detailed modelling work confirms that the overall impact of the development at Woodlands on the adjacent road network is minimal even in the event that it is allocated as an additional site over and above those currently proposed for allocation in the JSP. The development is expected to increase delay across the modelled network by only 25 seconds during the AM peak hour and 32 seconds during the PM peak hour. This level of increase in negligible and in all likelihood will be lower following the implementation of any mitigation (such as sustainable access measures).

50. These increases in delay are based on an extremely robust assessment as the model has been developed on the basis of applying a general background growth to the observed 2017 traffic surveys plus the addition of draft JSP site traffic. This overestimates traffic flows as the JSP vision on transport is to deliver a 2.5% reduction in car trips across the region during the plan period up to 2036.

51. The Woodlands traffic generation forecast is robust and does not represent the net change in traffic associated with the site, therefore the assumed Woodlands traffic overestimates traffic by around 136 vehicle movements during the AM peak hour and 118 vehicles over the PM Peak hour. In other words, the assessment has not removed the existing Woodlands site traffic from the network. The assessment work also does not account for any reduction in base traffic as a result of committed sustainable access schemes such as the Bristol Metrobus or JSP proposed schemes.

52. The traffic numbers do not take into account any reduction in car travel associated with the JSP and JST schemes as well as mitigation associated with the development itself.

53. The development therefore has a limited impact on the adjacent road network based on an extremely robust assessment methodology. The principle of development on the Woodlands site is in line with the requirements and the vision of the JST and JSP in transport terms.

54. A key vision of the JSP is to reduce the overall proportion of trips by car whilst increasing trip by active travel and sustainable modes. A key driver in achieving this is to carefully locate development that can realistically and cost effectively maximise travel by sustainable modes. The Woodlands site is by far (of the draft JSP sites considered within the assessment) the most qualified site to deliver this (cost effectively) given its proximity to existing and proposed employment. The Woodlands site is closest to any draft employment allocation when compared to the draft housing allocations assessed within this note.

APPENDIX A: EMPLOYMENT TRICS OUTPUTS

Calculation Reference: AUDIT-152303-161024-1044

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 02 - EMPLOYMENT
Category : A - OFFICE

VEHICLES

Selected regions and areas:

02	**SOUTH EAST**		
	ES	EAST SUSSEX	1 days
	HC	HAMPSHIRE	2 days
	KC	KENT	3 days
	SC	SURREY	4 days
04	**EAST ANGLIA**		
	CA	CAMBRIDGESHIRE	1 days
	SF	SUFFOLK	1 days
06	**WEST MIDLANDS**		
	WM	WEST MIDLANDS	1 days
07	**YORKSHIRE & NORTH LINCOLNSHIRE**		
	WY	WEST YORKSHIRE	1 days
08	**NORTH WEST**		
	LC	LANCASHIRE	1 days
09	**NORTH**		
	DH	DURHAM	2 days
	TW	TYNE & WEAR	4 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Filtering Stage 2 selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Gross floor area
Actual Range: 186 to 70291 (units: sqm)
Range Selected by User: 186 to 175000 (units: sqm)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/08 to 26/11/15

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	5 days
Tuesday	11 days
Wednesday	1 days
Thursday	3 days
Friday	1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	21 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Suburban Area (PPS6 Out of Centre)	11
Edge of Town	10

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Filtering Stage 3 selection:

Use Class:

B1	21 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

Not Known	1 days
1,001 to 5,000	1 days
5,001 to 10,000	7 days
10,001 to 15,000	5 days
15,001 to 20,000	2 days
25,001 to 50,000	5 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

Not Known	1 days
25,001 to 50,000	1 days
75,001 to 100,000	5 days
100,001 to 125,000	1 days
125,001 to 250,000	4 days
250,001 to 500,000	7 days
500,001 or More	2 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.5 or Less	1 days
0.6 to 1.0	10 days
1.1 to 1.5	9 days
1.6 to 2.0	1 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

Yes	10 days
No	11 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

LIST OF SITES relevant to selection parameters

1 **CA-02-A-04** **OFFICE** **CAMBRIDGESHIRE**
BRETTON WAY

PETERBOROUGH
Edge of Town
Commercial Zone
Total Gross floor area: 6483 sqm
Survey date: THURSDAY *20/10/11* *Survey Type: MANUAL*

2 **DH-02-A-01** **RPMI OFFICES** **DURHAM**
BRINKBURN ROAD

DARLINGTON
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Gross floor area: 3372 sqm
Survey date: FRIDAY *05/11/10* *Survey Type: MANUAL*

3 **DH-02-A-02** **CONSTRUCTION COMPANY** **DURHAM**
DURHAM ROAD
BOWBURN
NEAR DURHAM
Edge of Town
Industrial Zone
Total Gross floor area: 2000 sqm
Survey date: TUESDAY *27/11/12* *Survey Type: MANUAL*

4 **ES-02-A-11** **HOUSING COMPANY** **EAST SUSSEX**
THE SIDINGS
ORE VALLEY
HASTINGS
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Gross floor area: 186 sqm
Survey date: TUESDAY *17/11/15* *Survey Type: MANUAL*

5 **HC-02-A-11** **DIY CO. HQ** **HAMPSHIRE**
CHESTNUT AVENUE

CHANDLER'S FORD
Edge of Town
Commercial Zone
Total Gross floor area: 26100 sqm
Survey date: MONDAY *17/10/11* *Survey Type: MANUAL*

6 **HC-02-A-12** **HMRC** **HAMPSHIRE**
NORTHERN ROAD
COSHAM
PORTSMOUTH
Suburban Area (PPS6 Out of Centre)
No Sub Category
Total Gross floor area: 10100 sqm
Survey date: MONDAY *23/11/15* *Survey Type: MANUAL*

7 **KC-02-A-06** **LAND REGISTRY** **KENT**
FOREST ROAD
CAMDEN PARK
TUNBRIDGE WELLS
Edge of Town
Residential Zone
Total Gross floor area: 5677 sqm
Survey date: TUESDAY *01/12/09* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

8 **KC-02-A-07** **KCC HIGHWAYS REG.** **KENT**
KAVELIN WAY
HENWOOD IND. ESTATE
ASHFORD
Edge of Town
Commercial Zone
Total Gross floor area: 2525 sqm
Survey date: MONDAY *05/12/11* *Survey Type: MANUAL*

9 **KC-02-A-08** **KCC HIGHWAYS REG. OFFICE** **KENT**
ST MICHAEL'S CLOSE
CLAY WOOD
AYLESFORD
Edge of Town
Industrial Zone
Total Gross floor area: 3168 sqm
Survey date: MONDAY *28/11/11* *Survey Type: MANUAL*

10 **LC-02-A-09** **OFFICES** **LANCASHIRE**
FURTHERGATE

BLACKBURN
Suburban Area (PPS6 Out of Centre)
Built-Up Zone
Total Gross floor area: 2600 sqm
Survey date: TUESDAY *04/06/13* *Survey Type: MANUAL*

11 **SC-02-A-14** **UNILEVER** **SURREY**
SPRINGFIELD DRIVE

LEATHERHEAD
Edge of Town
Commercial Zone
Total Gross floor area: 19974 sqm
Survey date: TUESDAY *10/03/09* *Survey Type: MANUAL*

12 **SC-02-A-15** **ACCOUNTANTS** **SURREY**
BOXGROVE ROAD

GUILDFORD
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Gross floor area: 1896 sqm
Survey date: TUESDAY *05/10/10* *Survey Type: MANUAL*

13 **SC-02-A-16** **BANK OF AMERICA** **SURREY**
STANHOPE ROAD

CAMBERLEY
Edge of Town
Commercial Zone
Total Gross floor area: 39230 sqm
Survey date: TUESDAY *10/05/11* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

14 **SC-02-A-17** **PHARMACEUTICALS** **SURREY**
ST GEORGE'S AVENUE
THE HEATH
WEYBRIDGE
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Gross floor area: 10293 sqm
Survey date: TUESDAY *18/10/11* *Survey Type: MANUAL*

15 **SF-02-A-01** **COUNCIL OFFICES** **SUFFOLK**
BEETONS WAY

BURY ST. EDMUNDS
Suburban Area (PPS6 Out of Centre)
Industrial Zone
Total Gross floor area: 8000 sqm
Survey date: MONDAY *27/09/10* *Survey Type: MANUAL*

16 **TW-02-A-03** **DEVELOPMENT AGENCY** **TYNE & WEAR**
KINGFISHER BOULEVARD
LEMINGTON
NEWCASTLE UPON TYNE
Edge of Town
Commercial Zone
Total Gross floor area: 6480 sqm
Survey date: THURSDAY *11/12/08* *Survey Type: MANUAL*

17 **TW-02-A-04** **HOUSING CO.** **TYNE & WEAR**
EARLSWAY
TEAM VALLEY TRAD. EST.
GATESHEAD
Edge of Town
Industrial Zone
Total Gross floor area: 2500 sqm
Survey date: TUESDAY *29/09/09* *Survey Type: MANUAL*

18 **TW-02-A-05** **TELEVISION CO.** **TYNE & WEAR**
DELTA BANK ROAD
METRO RIVERSIDE PARK
GATESHEAD
Suburban Area (PPS6 Out of Centre)
Commercial Zone
Total Gross floor area: 1500 sqm
Survey date: TUESDAY *29/09/09* *Survey Type: MANUAL*

19 **TW-02-A-06** **GOVERNMENT OFFICES** **TYNE & WEAR**
BENTON PARK ROAD
LONGBENTON
NEWCASTLE UPON TYNE
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Gross floor area: 70291 sqm
Survey date: WEDNESDAY *25/11/09* *Survey Type: MANUAL*

20 **WM-02-A-04** **OFFICE** **WEST MIDLANDS**
BOURNVILLE LANE

BIRMINGHAM
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Gross floor area: 1800 sqm
Survey date: TUESDAY *10/11/15* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

21 WY-02-A-03 OFFICE **WEST YORKSHIRE**
VICTORIA ROAD
HEADINGLEY
LEEDS
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Gross floor area: 2696 sqm
Survey date: THURSDAY *17/06/10* *Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE

VEHICLES

Calculation factor: 100 sqm

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00	1	19974	0.020	1	19974	0.010	1	19974	0.030
06:00 - 07:00	3	33455	0.733	3	33455	0.187	3	33455	0.920
07:00 - 08:00	21	10803	0.877	21	10803	0.207	21	10803	1.084
08:00 - 09:00	**21**	**10803**	**1.410**	21	10803	0.265	**21**	**10803**	**1.675**
09:00 - 10:00	21	10803	0.818	21	10803	0.244	21	10803	1.062
10:00 - 11:00	21	10803	0.336	21	10803	0.145	21	10803	0.481
11:00 - 12:00	21	10803	0.266	21	10803	0.185	21	10803	0.451
12:00 - 13:00	21	10803	0.264	21	10803	0.301	21	10803	0.565
13:00 - 14:00	21	10803	0.312	21	10803	0.269	21	10803	0.581
14:00 - 15:00	21	10803	0.291	21	10803	0.361	21	10803	0.652
15:00 - 16:00	21	10803	0.265	21	10803	0.671	21	10803	0.936
16:00 - 17:00	21	10803	0.248	21	10803	1.064	21	10803	1.312
17:00 - 18:00	21	10803	0.195	**21**	**10803**	**1.211**	21	10803	1.406
18:00 - 19:00	21	10803	0.120	21	10803	0.518	21	10803	0.638
19:00 - 20:00	1	70291	0.175	1	70291	0.218	1	70291	0.393
20:00 - 21:00	1	70291	0.185	1	70291	0.198	1	70291	0.383
21:00 - 22:00	1	70291	0.084	1	70291	0.182	1	70291	0.266
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			6.599			6.236			12.835

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	186 - 70291 (units: sqm)
Survey date date range:	01/01/08 - 26/11/15
Number of weekdays (Monday-Friday):	21
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	3
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE

TAXIS

Calculation factor: 100 sqm

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00	1	19974	0.000	1	19974	0.000	1	19974	0.000
06:00 - 07:00	3	33455	0.008	3	33455	0.007	3	33455	0.015
07:00 - 08:00	21	10803	0.011	21	10803	0.010	21	10803	0.021
08:00 - 09:00	21	10803	0.013	21	10803	0.014	21	10803	0.027
09:00 - 10:00	**21**	**10803**	**0.025**	**21**	**10803**	**0.022**	**21**	**10803**	**0.047**
10:00 - 11:00	21	10803	0.009	21	10803	0.011	21	10803	0.020
11:00 - 12:00	21	10803	0.007	21	10803	0.007	21	10803	0.014
12:00 - 13:00	21	10803	0.006	21	10803	0.006	21	10803	0.012
13:00 - 14:00	21	10803	0.006	21	10803	0.006	21	10803	0.012
14:00 - 15:00	21	10803	0.006	21	10803	0.006	21	10803	0.012
15:00 - 16:00	21	10803	0.009	21	10803	0.008	21	10803	0.017
16:00 - 17:00	21	10803	0.007	21	10803	0.007	21	10803	0.014
17:00 - 18:00	21	10803	0.009	21	10803	0.010	21	10803	0.019
18:00 - 19:00	21	10803	0.007	21	10803	0.007	21	10803	0.014
19:00 - 20:00	1	70291	0.000	1	70291	0.000	1	70291	0.000
20:00 - 21:00	1	70291	0.004	1	70291	0.004	1	70291	0.008
21:00 - 22:00	1	70291	0.000	1	70291	0.000	1	70291	0.000
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.127			0.125			0.252

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	186 - 70291 (units: sqm)
Survey date date range:	01/01/08 - 26/11/15
Number of weekdays (Monday-Friday):	21
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	3
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE

OGVS

Calculation factor: 100 sqm

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00	1	19974	0.000	1	19974	0.000	1	19974	0.000
06:00 - 07:00	3	33455	0.006	3	33455	0.004	3	33455	0.010
07:00 - 08:00	21	10803	0.004	21	10803	0.004	21	10803	0.008
08:00 - 09:00	21	10803	0.006	21	10803	0.004	21	10803	0.010
09:00 - 10:00	21	10803	0.006	21	10803	0.007	21	10803	0.013
10:00 - 11:00	21	10803	0.006	21	10803	0.005	21	10803	0.011
11:00 - 12:00	**21**	**10803**	**0.007**	**21**	**10803**	**0.007**	**21**	**10803**	**0.014**
12:00 - 13:00	21	10803	0.004	21	10803	0.003	21	10803	0.007
13:00 - 14:00	21	10803	0.003	21	10803	0.004	21	10803	0.007
14:00 - 15:00	21	10803	0.004	21	10803	0.004	21	10803	0.008
15:00 - 16:00	21	10803	0.003	21	10803	0.004	21	10803	0.007
16:00 - 17:00	21	10803	0.004	21	10803	0.003	21	10803	0.007
17:00 - 18:00	21	10803	0.000	21	10803	0.002	21	10803	0.002
18:00 - 19:00	21	10803	0.001	21	10803	0.000	21	10803	0.001
19:00 - 20:00	1	70291	0.001	1	70291	0.001	1	70291	0.002
20:00 - 21:00	1	70291	0.000	1	70291	0.001	1	70291	0.001
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.055			0.053			0.108

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	186 - 70291 (units: sqm)
Survey date date range:	01/01/08 - 26/11/15
Number of weekdays (Monday-Friday):	21
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	3
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE

PSVS

Calculation factor: 100 sqm

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00	1	19974	0.000	1	19974	0.000	1	19974	0.000
06:00 - 07:00	3	33455	0.002	3	33455	0.002	3	33455	0.004
07:00 - 08:00	21	10803	0.004	21	10803	0.003	21	10803	0.007
08:00 - 09:00	21	10803	0.005	21	10803	0.004	21	10803	0.009
09:00 - 10:00	21	10803	0.004	21	10803	0.004	21	10803	0.008
10:00 - 11:00	21	10803	0.004	21	10803	0.004	21	10803	0.008
11:00 - 12:00	21	10803	0.004	21	10803	0.003	21	10803	0.007
12:00 - 13:00	21	10803	0.004	21	10803	0.004	21	10803	0.008
13:00 - 14:00	21	10803	0.005	21	10803	0.004	21	10803	0.009
14:00 - 15:00	21	10803	0.004	21	10803	0.004	21	10803	0.008
15:00 - 16:00	**21**	**10803**	**0.006**	**21**	**10803**	**0.006**	**21**	**10803**	**0.012**
16:00 - 17:00	21	10803	0.004	21	10803	0.006	21	10803	0.010
17:00 - 18:00	21	10803	0.004	21	10803	0.004	21	10803	0.008
18:00 - 19:00	21	10803	0.002	21	10803	0.003	21	10803	0.005
19:00 - 20:00	1	70291	0.000	1	70291	0.000	1	70291	0.000
20:00 - 21:00	1	70291	0.000	1	70291	0.000	1	70291	0.000
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.052			0.051			0.103

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	186 - 70291 (units: sqm)
Survey date date range:	01/01/08 - 26/11/15
Number of weekdays (Monday-Friday):	21
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	3
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE

CYCLISTS

Calculation factor: 100 sqm

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00	1	19974	0.000	1	19974	0.000	1	19974	0.000
06:00 - 07:00	3	33455	0.008	3	33455	0.005	3	33455	0.013
07:00 - 08:00	21	10803	0.013	21	10803	0.002	21	10803	0.015
08:00 - 09:00	**21**	**10803**	**0.035**	21	10803	0.001	**21**	**10803**	**0.036**
09:00 - 10:00	21	10803	0.008	21	10803	0.001	21	10803	0.009
10:00 - 11:00	21	10803	0.004	21	10803	0.002	21	10803	0.006
11:00 - 12:00	21	10803	0.004	21	10803	0.001	21	10803	0.005
12:00 - 13:00	21	10803	0.002	21	10803	0.002	21	10803	0.004
13:00 - 14:00	21	10803	0.003	21	10803	0.003	21	10803	0.006
14:00 - 15:00	21	10803	0.004	21	10803	0.003	21	10803	0.007
15:00 - 16:00	21	10803	0.004	21	10803	0.007	21	10803	0.011
16:00 - 17:00	21	10803	0.003	21	10803	0.018	21	10803	0.021
17:00 - 18:00	21	10803	0.000	**21**	**10803**	**0.032**	21	10803	0.032
18:00 - 19:00	21	10803	0.001	21	10803	0.006	21	10803	0.007
19:00 - 20:00	1	70291	0.003	1	70291	0.004	1	70291	0.007
20:00 - 21:00	1	70291	0.000	1	70291	0.009	1	70291	0.009
21:00 - 22:00				1	70291	0.001			
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.092			0.097			0.188

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	186 - 70291 (units: sqm)
Survey date date range:	01/01/08 - 26/11/15
Number of weekdays (Monday-Friday):	21
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	3
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Calculation Reference: AUDIT-152303-170301-0349

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 02 - EMPLOYMENT
Category : D - INDUSTRIAL ESTATE

VEHICLES

Selected regions and areas:

03	**SOUTH WEST**		
	CW	CORNWALL	1 days
11	**SCOTLAND**		
	AG	ANGUS	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Secondary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter:	Gross floor area
Actual Range:	36500 to 64889 (units: sqm)
Range Selected by User:	25000 to 234115 (units: sqm)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/08 to 24/03/14

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	1 days
Friday	1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	2 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Edge of Town	1
Neighbourhood Centre (PPS6 Local Centre)	1

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Residential Zone	1
Village	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Secondary Filtering selection:

Use Class:

B2	2 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

1,000 or Less	1 days
15,001 to 20,000	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

25,001 to 50,000	2 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	1 days
1.1 to 1.5	1 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

No	2 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	2 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 **AG-02-D-01** **INDUSTRIAL EST.** **ANGUS**
WESTWAY

ARBROATH
Edge of Town
Residential Zone
Total Gross floor area: 64889 sqm
Survey date: FRIDAY *25/05/12* *Survey Type: MANUAL*

2 **CW-02-D-03** **IND. ESTATE** **CORNWALL**
LONG ROCK ROAD
LONG ROCK
NEAR PENZANCE
Neighbourhood Centre (PPS6 Local Centre)
Village
Total Gross floor area: 36500 sqm
Survey date: MONDAY *03/10/11* *Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE

VEHICLES

Calculation factor: 100 sqm

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	**2**	**50695**	**0.459**	2	50695	0.126	2	50695	0.585
08:00 - 09:00	2	50695	0.397	2	50695	0.218	**2**	**50695**	**0.615**
09:00 - 10:00	2	50695	0.253	2	50695	0.216	2	50695	0.469
10:00 - 11:00	2	50695	0.206	2	50695	0.209	2	50695	0.415
11:00 - 12:00	2	50695	0.247	2	50695	0.241	2	50695	0.488
12:00 - 13:00	2	50695	0.231	2	50695	0.270	2	50695	0.501
13:00 - 14:00	2	50695	0.232	2	50695	0.229	2	50695	0.461
14:00 - 15:00	2	50695	0.215	2	50695	0.235	2	50695	0.450
15:00 - 16:00	2	50695	0.187	2	50695	0.229	2	50695	0.416
16:00 - 17:00	2	50695	0.187	**2**	**50695**	**0.389**	2	50695	0.576
17:00 - 18:00	2	50695	0.073	2	50695	0.314	2	50695	0.387
18:00 - 19:00	2	50695	0.076	2	50695	0.109	2	50695	0.185
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			2.763			2.785			5.548

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	36500 - 64889 (units: sqm)
Survey date date range:	01/01/08 - 24/03/14
Number of weekdays (Monday-Friday):	2
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE

TAXIS

Calculation factor: 100 sqm

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	**2**	**50695**	**0.004**	2	50695	0.000	2	50695	0.004
08:00 - 09:00	2	50695	0.001	2	50695	0.002	2	50695	0.003
09:00 - 10:00	2	50695	0.004	2	50695	0.004	2	50695	0.008
10:00 - 11:00	2	50695	0.002	2	50695	0.002	2	50695	0.004
11:00 - 12:00	2	50695	0.001	2	50695	0.000	2	50695	0.001
12:00 - 13:00	2	50695	0.002	2	50695	0.002	2	50695	0.004
13:00 - 14:00	2	50695	0.001	2	50695	0.002	2	50695	0.003
14:00 - 15:00	2	50695	0.001	2	50695	0.000	2	50695	0.001
15:00 - 16:00	2	50695	0.001	2	50695	0.002	2	50695	0.003
16:00 - 17:00	2	50695	0.002	2	50695	0.002	2	50695	0.004
17:00 - 18:00	2	50695	0.004	**2**	**50695**	**0.005**	**2**	**50695**	**0.009**
18:00 - 19:00	2	50695	0.002	2	50695	0.002	2	50695	0.004
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.025			0.023			0.048

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	36500 - 64889 (units: sqm)
Survey date date range:	01/01/08 - 24/03/14
Number of weekdays (Monday-Friday):	2
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE

OGVS

Calculation factor: 100 sqm

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	2	50695	0.017	2	50695	0.025	2	50695	0.042
08:00 - 09:00	2	50695	0.022	2	50695	0.016	2	50695	0.038
09:00 - 10:00	2	50695	0.027	2	50695	0.026	2	50695	0.053
10:00 - 11:00	2	50695	0.023	**2**	**50695**	**0.032**	2	50695	0.055
11:00 - 12:00	**2**	**50695**	**0.032**	2	50695	0.030	**2**	**50695**	**0.062**
12:00 - 13:00	2	50695	0.018	2	50695	0.022	2	50695	0.040
13:00 - 14:00	2	50695	0.027	2	50695	0.021	2	50695	0.048
14:00 - 15:00	2	50695	0.018	2	50695	0.027	2	50695	0.045
15:00 - 16:00	2	50695	0.020	2	50695	0.020	2	50695	0.040
16:00 - 17:00	2	50695	0.027	2	50695	0.013	2	50695	0.040
17:00 - 18:00	2	50695	0.004	2	50695	0.002	2	50695	0.006
18:00 - 19:00	2	50695	0.001	2	50695	0.000	2	50695	0.001
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.236			0.234			0.470

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	36500 - 64889 (units: sqm)
Survey date date range:	01/01/08 - 24/03/14
Number of weekdays (Monday-Friday):	2
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE

PSVS

Calculation factor: 100 sqm

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	2	50695	0.000	2	50695	0.000	2	50695	0.000
08:00 - 09:00	2	50695	0.000	2	50695	0.000	2	50695	0.000
09:00 - 10:00	2	50695	0.004	2	50695	0.001	2	50695	0.005
10:00 - 11:00	2	50695	0.000	**2**	**50695**	**0.003**	2	50695	0.003
11:00 - 12:00	2	50695	0.000	2	50695	0.002	2	50695	0.002
12:00 - 13:00	2	50695	0.000	2	50695	0.000	2	50695	0.000
13:00 - 14:00	2	50695	0.000	2	50695	0.000	2	50695	0.000
14:00 - 15:00	2	50695	0.000	2	50695	0.001	2	50695	0.001
15:00 - 16:00	2	50695	0.000	2	50695	0.002	2	50695	0.002
16:00 - 17:00	2	50695	0.003	2	50695	0.001	2	50695	0.004
17:00 - 18:00	2	50695	0.005	2	50695	0.000	2	50695	0.005
18:00 - 19:00	**2**	**50695**	**0.006**	2	50695	0.002	**2**	**50695**	**0.008**
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.018			0.012			0.030

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	36500 - 64889 (units: sqm)
Survey date date range:	01/01/08 - 24/03/14
Number of weekdays (Monday-Friday):	2
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE

CYCLISTS

Calculation factor: 100 sqm

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	2	50695	0.002	2	50695	0.000	2	50695	0.002
08:00 - 09:00	2	50695	0.003	2	50695	0.000	2	50695	0.003
09:00 - 10:00	2	50695	0.001	2	50695	0.000	2	50695	0.001
10:00 - 11:00	**2**	**50695**	**0.007**	**2**	**50695**	**0.009**	**2**	**50695**	**0.016**
11:00 - 12:00	2	50695	0.001	2	50695	0.000	2	50695	0.001
12:00 - 13:00	2	50695	0.000	2	50695	0.002	2	50695	0.002
13:00 - 14:00	2	50695	0.001	2	50695	0.001	2	50695	0.002
14:00 - 15:00	2	50695	0.000	2	50695	0.000	2	50695	0.000
15:00 - 16:00	2	50695	0.001	2	50695	0.000	2	50695	0.001
16:00 - 17:00	2	50695	0.001	2	50695	0.002	2	50695	0.003
17:00 - 18:00	2	50695	0.000	2	50695	0.002	2	50695	0.002
18:00 - 19:00	2	50695	0.001	2	50695	0.000	2	50695	0.001
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.018			0.016			0.034

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	36500 - 64889 (units: sqm)
Survey date date range:	01/01/08 - 24/03/14
Number of weekdays (Monday-Friday):	2
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Calculation Reference: AUDIT-152303-160926-0959

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 02 - EMPLOYMENT
Category : F - WAREHOUSING (COMMERCIAL)

VEHICLES

Selected regions and areas:

02	**SOUTH EAST**		
	HF	HERTFORDSHIRE	1 days
04	**EAST ANGLIA**		
	SF	SUFFOLK	1 days
05	**EAST MIDLANDS**		
	LN	LINCOLNSHIRE	1 days
09	**NORTH**		
	TV	TEES VALLEY	1 days
10	**WALES**		
	WR	WREXHAM	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Filtering Stage 2 selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter:	Gross floor area
Actual Range:	9000 to 80066 (units: sqm)
Range Selected by User:	5000 to 80066 (units: sqm)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/08 to 11/07/13

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	1 days
Tuesday	2 days
Thursday	2 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	5 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Suburban Area (PPS6 Out of Centre)	1
Edge of Town	3
Free Standing (PPS6 Out of Town)	1

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Industrial Zone	3
Commercial Zone	1
No Sub Category	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Filtering Stage 3 selection:

Use Class:

B8	5 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

1,000 or Less	1 days
1,001 to 5,000	2 days
10,001 to 15,000	2 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

5,001 to 25,000	1 days
25,001 to 50,000	1 days
50,001 to 75,000	1 days
100,001 to 125,000	1 days
125,001 to 250,000	1 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	1 days
1.1 to 1.5	4 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

Yes	1 days
No	4 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

LIST OF SITES relevant to selection parameters

1 HF-02-F-03 DISTRIBUTION CEN. HERTFORDSHIRE

HATFIELD BUSINESS CEN.
HATFIELD
Edge of Town
Commercial Zone
Total Gross floor area: 80000 sqm
Survey date: THURSDAY 10/07/08 Survey Type: MANUAL

2 LN-02-F-01 BOOK SERVICE LINCOLNSHIRE

TRENT ROAD

GRANTHAM
Edge of Town
No Sub Category
Total Gross floor area: 32300 sqm
Survey date: MONDAY 29/11/10 Survey Type: MANUAL

3 SF-02-F-02 WAREHOUSING SUFFOLK

WALTON ROAD

FELIXSTOWE
Suburban Area (PPS6 Out of Centre)
Industrial Zone
Total Gross floor area: 22270 sqm
Survey date: THURSDAY 11/07/13 Survey Type: MANUAL

4 TV-02-F-02 ARGOS WAREHOUSE TEES VALLEY

ROUNDHOUSE ROAD
FAVERDALE
DARLINGTON
Edge of Town
Industrial Zone
Total Gross floor area: 80066 sqm
Survey date: TUESDAY 07/10/08 Survey Type: MANUAL

5 WR-02-F-01 WAREHOUSE WREXHAM

UNIT 1-2 PACIFIC PARK
WREXHAM IND. ESTATE
NEAR WREXHAM
Free Standing (PPS6 Out of Town)
Industrial Zone
Total Gross floor area: 9000 sqm
Survey date: TUESDAY 18/10/11 Survey Type: MANUAL

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)

VEHICLES

Calculation factor: 100 sqm

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 00:30									
00:30 - 01:00									
01:00 - 01:30									
01:30 - 02:00									
02:00 - 02:30									
02:30 - 03:00									
03:00 - 03:30									
03:30 - 04:00									
04:00 - 04:30									
04:30 - 05:00									
05:00 - 05:30	1	22270	0.013	1	22270	0.018	1	22270	0.031
05:30 - 06:00	1	22270	0.004	1	22270	0.022	1	22270	0.026
06:00 - 06:30	1	22270	0.018	1	22270	0.022	1	22270	0.040
06:30 - 07:00	1	22270	0.040	1	22270	0.040	1	22270	0.080
07:00 - 07:30	5	44727	0.026	5	44727	0.021	5	44727	0.047
07:30 - 08:00	5	44727	0.043	5	44727	0.028	5	44727	0.071
08:00 - 08:30	5	44727	0.022	5	44727	0.014	5	44727	0.036
08:30 - 09:00	5	44727	0.030	5	44727	0.018	5	44727	0.048
09:00 - 09:30	5	44727	0.033	5	44727	0.019	5	44727	0.052
09:30 - 10:00	5	44727	0.025	5	44727	0.020	5	44727	0.045
10:00 - 10:30	5	44727	0.019	5	44727	0.022	5	44727	0.041
10:30 - 11:00	5	44727	0.023	5	44727	0.018	5	44727	0.041
11:00 - 11:30	5	44727	0.017	5	44727	0.019	5	44727	0.036
11:30 - 12:00	5	44727	0.020	5	44727	0.021	5	44727	0.041
12:00 - 12:30	5	44727	0.024	5	44727	0.023	5	44727	0.047
12:30 - 13:00	5	44727	0.021	5	44727	0.024	5	44727	0.045
13:00 - 13:30	5	44727	0.036	5	44727	0.030	5	44727	0.066
13:30 - 14:00	**5**	**44727**	**0.055**	5	44727	0.039	**5**	**44727**	**0.094**
14:00 - 14:30	5	44727	0.031	**5**	**44727**	**0.050**	5	44727	0.081
14:30 - 15:00	5	44727	0.036	5	44727	0.039	5	44727	0.075
15:00 - 15:30	5	44727	0.030	5	44727	0.045	5	44727	0.075
15:30 - 16:00	5	44727	0.039	5	44727	0.038	5	44727	0.077
16:00 - 16:30	5	44727	0.030	5	44727	0.040	5	44727	0.070
16:30 - 17:00	5	44727	0.023	5	44727	0.040	5	44727	0.063
17:00 - 17:30	5	44727	0.013	5	44727	0.037	5	44727	0.050
17:30 - 18:00	5	44727	0.011	5	44727	0.030	5	44727	0.041
18:00 - 18:30	5	44727	0.008	5	44727	0.023	5	44727	0.031
18:30 - 19:00	5	44727	0.007	5	44727	0.018	5	44727	0.025
19:00 - 19:30	1	22270	0.027	1	22270	0.013	1	22270	0.040
19:30 - 20:00	1	22270	0.009	1	22270	0.018	1	22270	0.027
20:00 - 20:30	1	22270	0.004	1	22270	0.018	1	22270	0.022
20:30 - 21:00	1	22270	0.009	1	22270	0.013	1	22270	0.022
21:00 - 21:30	1	22270	0.018	1	22270	0.009	1	22270	0.027
21:30 - 22:00	1	22270	0.013	1	22270	0.009	1	22270	0.022
22:00 - 22:30									
22:30 - 23:00									
23:00 - 23:30									
23:30 - 24:00									
Total Rates:			0.777			0.858			1.635

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	9000 - 80066 (units: sqm)
Survey date date range:	01/01/08 - 11/07/13
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)

TAXIS

Calculation factor: 100 sqm

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 00:30									
00:30 - 01:00									
01:00 - 01:30									
01:30 - 02:00									
02:00 - 02:30									
02:30 - 03:00									
03:00 - 03:30									
03:30 - 04:00									
04:00 - 04:30									
04:30 - 05:00									
05:00 - 05:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
05:30 - 06:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
06:00 - 06:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
06:30 - 07:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
07:00 - 07:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
07:30 - 08:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
08:00 - 08:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
08:30 - 09:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
09:00 - 09:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
09:30 - 10:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
10:00 - 10:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
10:30 - 11:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
11:00 - 11:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
11:30 - 12:00	**5**	**44727**	**0.000**	**5**	**44727**	**0.000**	5	44727	0.000
12:00 - 12:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
12:30 - 13:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
13:00 - 13:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
13:30 - 14:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
14:00 - 14:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
14:30 - 15:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
15:00 - 15:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
15:30 - 16:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
16:00 - 16:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
16:30 - 17:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
17:00 - 17:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
17:30 - 18:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
18:00 - 18:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
18:30 - 19:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
19:00 - 19:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
19:30 - 20:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
20:00 - 20:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
20:30 - 21:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
21:00 - 21:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
21:30 - 22:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
22:00 - 22:30									
22:30 - 23:00									
23:00 - 23:30									
23:30 - 24:00									
Total Rates:			0.000			0.000			0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	9000 - 80066 (units: sqm)
Survey date date range:	01/01/08 - 11/07/13
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)

OGVS

Calculation factor: 100 sqm

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 00:30									
00:30 - 01:00									
01:00 - 01:30									
01:30 - 02:00									
02:00 - 02:30									
02:30 - 03:00									
03:00 - 03:30									
03:30 - 04:00									
04:00 - 04:30									
04:30 - 05:00									
05:00 - 05:30	1	22270	0.009	1	22270	0.018	1	22270	0.027
05:30 - 06:00	1	22270	0.004	1	22270	0.022	1	22270	0.026
06:00 - 06:30	1	22270	0.009	1	22270	0.022	1	22270	0.031
06:30 - 07:00	**1**	**22270**	**0.018**	**1**	**22270**	**0.040**	**1**	**22270**	**0.058**
07:00 - 07:30	5	44727	0.005	5	44727	0.005	5	44727	0.010
07:30 - 08:00	5	44727	0.008	5	44727	0.005	5	44727	0.013
08:00 - 08:30	5	44727	0.004	5	44727	0.004	5	44727	0.008
08:30 - 09:00	5	44727	0.004	5	44727	0.004	5	44727	0.008
09:00 - 09:30	5	44727	0.008	5	44727	0.007	5	44727	0.015
09:30 - 10:00	5	44727	0.005	5	44727	0.007	5	44727	0.012
10:00 - 10:30	5	44727	0.009	5	44727	0.008	5	44727	0.017
10:30 - 11:00	5	44727	0.008	5	44727	0.007	5	44727	0.015
11:00 - 11:30	5	44727	0.006	5	44727	0.008	5	44727	0.014
11:30 - 12:00	5	44727	0.005	5	44727	0.008	5	44727	0.013
12:00 - 12:30	5	44727	0.006	5	44727	0.007	5	44727	0.013
12:30 - 13:00	5	44727	0.004	5	44727	0.006	5	44727	0.010
13:00 - 13:30	5	44727	0.005	5	44727	0.006	5	44727	0.011
13:30 - 14:00	5	44727	0.008	5	44727	0.002	5	44727	0.010
14:00 - 14:30	5	44727	0.008	5	44727	0.005	5	44727	0.013
14:30 - 15:00	5	44727	0.007	5	44727	0.006	5	44727	0.013
15:00 - 15:30	5	44727	0.008	5	44727	0.007	5	44727	0.015
15:30 - 16:00	5	44727	0.009	5	44727	0.005	5	44727	0.014
16:00 - 16:30	5	44727	0.008	5	44727	0.003	5	44727	0.011
16:30 - 17:00	5	44727	0.008	5	44727	0.005	5	44727	0.013
17:00 - 17:30	5	44727	0.006	5	44727	0.004	5	44727	0.010
17:30 - 18:00	5	44727	0.003	5	44727	0.006	5	44727	0.009
18:00 - 18:30	5	44727	0.002	5	44727	0.004	5	44727	0.006
18:30 - 19:00	5	44727	0.002	5	44727	0.006	5	44727	0.008
19:00 - 19:30	1	22270	0.013	1	22270	0.013	1	22270	0.026
19:30 - 20:00	1	22270	0.004	1	22270	0.009	1	22270	0.013
20:00 - 20:30	1	22270	0.004	1	22270	0.018	1	22270	0.022
20:30 - 21:00	1	22270	0.009	1	22270	0.009	1	22270	0.018
21:00 - 21:30	1	22270	0.013	1	22270	0.004	1	22270	0.017
21:30 - 22:00	1	22270	0.013	1	22270	0.000	1	22270	0.013
22:00 - 22:30									
22:30 - 23:00									
23:00 - 23:30									
23:30 - 24:00									
Total Rates:			0.242			0.290			0.532

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	9000 - 80066 (units: sqm)
Survey date date range:	01/01/08 - 11/07/13
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)

PSVS

Calculation factor: 100 sqm

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 00:30									
00:30 - 01:00									
01:00 - 01:30									
01:30 - 02:00									
02:00 - 02:30									
02:30 - 03:00									
03:00 - 03:30									
03:30 - 04:00									
04:00 - 04:30									
04:30 - 05:00									
05:00 - 05:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
05:30 - 06:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
06:00 - 06:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
06:30 - 07:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
07:00 - 07:30	5	44727	0.000	**5**	**44727**	**0.000**	5	44727	0.000
07:30 - 08:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
08:00 - 08:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
08:30 - 09:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
09:00 - 09:30	**5**	**44727**	**0.000**	5	44727	0.000	5	44727	0.000
09:30 - 10:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
10:00 - 10:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
10:30 - 11:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
11:00 - 11:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
11:30 - 12:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
12:00 - 12:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
12:30 - 13:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
13:00 - 13:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
13:30 - 14:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
14:00 - 14:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
14:30 - 15:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
15:00 - 15:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
15:30 - 16:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
16:00 - 16:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
16:30 - 17:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
17:00 - 17:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
17:30 - 18:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
18:00 - 18:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
18:30 - 19:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
19:00 - 19:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
19:30 - 20:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
20:00 - 20:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
20:30 - 21:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
21:00 - 21:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
21:30 - 22:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
22:00 - 22:30									
22:30 - 23:00									
23:00 - 23:30									
23:30 - 24:00									
Total Rates:			0.000			0.000			0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	9000 - 80066 (units: sqm)
Survey date date range:	01/01/08 - 11/07/13
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)

CYCLISTS

Calculation factor: 100 sqm

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 00:30									
00:30 - 01:00									
01:00 - 01:30									
01:30 - 02:00									
02:00 - 02:30									
02:30 - 03:00									
03:00 - 03:30									
03:30 - 04:00									
04:00 - 04:30									
04:30 - 05:00									
05:00 - 05:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
05:30 - 06:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
06:00 - 06:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
06:30 - 07:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
07:00 - 07:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
07:30 - 08:00	5	44727	0.003	5	44727	0.000	5	44727	0.003
08:00 - 08:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
08:30 - 09:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
09:00 - 09:30	5	44727	0.001	5	44727	0.000	5	44727	0.001
09:30 - 10:00	5	44727	0.001	5	44727	0.000	5	44727	0.001
10:00 - 10:30	5	44727	0.000	5	44727	0.001	5	44727	0.001
10:30 - 11:00	5	44727	0.000	5	44727	0.001	5	44727	0.001
11:00 - 11:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
11:30 - 12:00	5	44727	0.000	5	44727	0.002	5	44727	0.002
12:00 - 12:30	5	44727	0.000	5	44727	0.000	5	44727	0.000
12:30 - 13:00	5	44727	0.000	5	44727	0.002	5	44727	0.002
13:00 - 13:30	5	44727	0.004	5	44727	0.001	5	44727	0.005
13:30 - 14:00	**5**	**44727**	**0.005**	**5**	**44727**	**0.008**	**5**	**44727**	**0.013**
14:00 - 14:30	5	44727	0.001	5	44727	0.007	5	44727	0.008
14:30 - 15:00	5	44727	0.000	5	44727	0.001	5	44727	0.001
15:00 - 15:30	5	44727	0.001	5	44727	0.001	5	44727	0.002
15:30 - 16:00	5	44727	0.002	5	44727	0.002	5	44727	0.004
16:00 - 16:30	5	44727	0.000	5	44727	0.002	5	44727	0.002
16:30 - 17:00	5	44727	0.000	5	44727	0.001	5	44727	0.001
17:00 - 17:30	5	44727	0.000	5	44727	0.004	5	44727	0.004
17:30 - 18:00	5	44727	0.000	5	44727	0.000	5	44727	0.000
18:00 - 18:30	5	44727	0.000	5	44727	0.001	5	44727	0.001
18:30 - 19:00	5	44727	0.001	5	44727	0.001	5	44727	0.002
19:00 - 19:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
19:30 - 20:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
20:00 - 20:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
20:30 - 21:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
21:00 - 21:30	1	22270	0.000	1	22270	0.000	1	22270	0.000
21:30 - 22:00	1	22270	0.000	1	22270	0.000	1	22270	0.000
22:00 - 22:30									
22:30 - 23:00									
23:00 - 23:30									
23:30 - 24:00									
Total Rates:			0.019			0.035			0.054

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	9000 - 80066 (units: sqm)
Survey date date range:	01/01/08 - 11/07/13
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

APPENDIX B: TRAFFIC DATA

Charfield

Land Use	AM Peak			PM Peak		
	IN	OUT	TOT	IN	OUT	TOT
Dwellings	**159**	**406**	**565**	**378**	**236**	**615**
To Emp	*40*	*103*	*144*	*142*	*89*	*230*
To Shop	*6*	*16*	*22*	*46*	*29*	*75*
Leisure	*10*	*26*	*36*	*97*	*61*	*158*
Edu	*80*	*204*	*284*	*16*	*10*	*26*
Other	*22*	*57*	*80*	*77*	*48*	*124*
Employment	**93**	**26**	**119**	**15**	**80**	**94**
Primary Education	**87**	**62**	**148**	**9**	**13**	**22**
Secondary Education	**0**	**0**	**0**	**0**	**0**	**0**
Care Home	**0**	**0**	**0**	**0**	**0**	**0**
TOTAL	**338**	**494**	**832**	**401**	**329**	**731**
To Emp	*25%*	*25%*	*25%*	*37%*	*37%*	*37%*
To Shop	*4%*	*4%*	*4%*	*12%*	*12%*	*12%*
Leisure	*6%*	*6%*	*6%*	*26%*	*26%*	*26%*
Edu	*50%*	*50%*	*50%*	*4%*	*4%*	*4%*
Other	*14%*	*14%*	*14%*	*20%*	*20%*	*20%*

INTERNALISATION

Land Use	AM Peak			PM Peak		
	IN	OUT	TOT	IN	OUT	TOT
Dwellings	**-87**	**-55**	**-142**	**-26**	**-47**	**-73**
To Emp	*-3*	*-9*	*-12*	*-8*	*-1*	*-9*
To Shop	*-1*	*-3*	*-4*	*-9*	*-6*	*-15*
Leisure	*-2*	*-5*	*-7*	*-19*	*-12*	*-32*
Edu	*-49*	*-69*	*-119*	*-11*	*-7*	*-17*
Other						
Employment	**-9**	**-3**	**-12**	**-1**	**-8**	**-9**
Primary Education	**-69**	**-49**	**-119**	**-7**	**-11**	**-17**
Secondary Education				**0**	**0**	**0**
Care Home						
TOTAL	**-166**	**-107**	**-273**	**-34**	**-66**	**-100**

EXTERNAL

Land Use	AM Peak			PM Peak		
	IN	OUT	TOT	IN	OUT	TOT
Dwellings	**72**	**351**	**423**	**352**	**189**	**541**
To Emp	*38*	*94*	*132*	*134*	*87*	*221*
To Shop	*5*	*13*	*18*	*37*	*23*	*60*
Leisure	*8*	*21*	*29*	*78*	*49*	*127*
Edu	*30*	*135*	*165*	*6*	*3*	*9*
Other	*22*	*57*	*80*	*77*	*48*	*124*
Employment	**84**	**23**	**107**	**13**	**72**	**85**
Primary Education	**17**	**12**	**30**	**2**	**3**	**4**
Secondary Education	**0**	**0**	**0**	**0**	**0**	**0**
Care Home	**0**	**0**	**0**	**0**	**0**	**0**
TOTAL	**173**	**387**	**560**	**367**	**263**	**630**

TOTAL External	0800 to 0900			1700 to 1800		
	IN	OUT	TOT	IN	OUT	TOT
Resi and Edu	89	363	453	354	192	546
Employment	84	23	107	13	72	85

0.92

With 8% discount PTP	0800 to 0900			1700 to 1800		
	IN	OUT	TOT	IN	OUT	TOT
Resi and Edu	82	334	417	326	176	502
Employment	77	21	98	12	66	78

Coalpit Heath

Land Use	AM Peak			PM Peak		
	IN	OUT	TOT	IN	OUT	TOT
Dwellings	**217**	**554**	**771**	**516**	**322**	**838**
To Emp	*55*	*141*	*196*	*193*	*121*	*314*
To Shop	*8*	*22*	*30*	*63*	*39*	*102*
Leisure	*14*	*35*	*49*	*133*	*83*	*216*
Edu	*109*	*278*	*387*	*22*	*14*	*36*
Other	*30*	*78*	*108*	*104*	*65*	*170*
Employment	**15**	**4**	**20**	**2**	**13**	**16**
Primary Education	**116**	**82**	**198**	**11**	**18**	**29**
Secondary Education	**0**	**0**	**0**	**0**	**0**	**0**
Care Home	**0**	**0**	**0**	**0**	**0**	**0**
TOTAL	**348**	**641**	**988**	**530**	**353**	**883**
To Emp	*25%*	*25%*	*25%*	*37%*	*37%*	*37%*
To Shop	*4%*	*4%*	*4%*	*12%*	*12%*	*12%*
Leisure	*6%*	*6%*	*6%*	*26%*	*26%*	*26%*
Edu	*50%*	*50%*	*50%*	*4%*	*4%*	*4%*
Other	*14%*	*14%*	*14%*	*20%*	*20%*	*20%*

INTERNALISATION

Land Use	AM Peak			PM Peak		
	IN	OUT	TOT	IN	OUT	TOT
Dwellings	**-105**	**-71**	**-176**	**-34**	**-55**	**-88**
To Emp	*0*	*-2*	*-2*	*-1*	*0*	*-2*
To Shop	*-2*	*-4*	*-6*	*-13*	*-8*	*-20*
Leisure	*-3*	*-7*	*-10*	*-27*	*-17*	*-43*
Edu	*-66*	*-92*	*-158*	*-14*	*-9*	*-23*
Other						
Employment	**-2**	**0**	**-2**	**0**	**-1**	**-2**
Primary Education	**-92**	**-66**	**-158**	**-9**	**-14**	**-23**
Secondary Education				**0**	**0**	**0**
Care Home						
TOTAL	**-199**	**-137**	**-336**	**-43**	**-70**	**-113**

EXTERNAL

Land Use	AM Peak			PM Peak		
	IN	OUT	TOT	IN	OUT	TOT
Dwellings	**111**	**483**	**595**	**482**	**268**	**750**
To Emp	*55*	*139*	*194*	*192*	*121*	*313*
To Shop	*7*	*17*	*24*	*50*	*31*	*82*
Leisure	*11*	*28*	*39*	*106*	*66*	*173*
Edu	*43*	*186*	*229*	*8*	*5*	*13*
Other	*30*	*78*	*108*	*104*	*65*	*170*
Employment	**14**	**4**	**18**	**2**	**12**	**14**
Primary Education	**23**	**16**	**40**	**2**	**4**	**6**
Secondary Education	**0**	**0**	**0**	**0**	**0**	**0**
Care Home	**0**	**0**	**0**	**0**	**0**	**0**
TOTAL	**148**	**504**	**652**	**487**	**283**	**770**

TOTAL External	0800 to 0900			1700 to 1800		
	IN	OUT	TOT	IN	OUT	TOT
Resi and Edu	134	500	634	484	271	756
Employment	14	4	18	2	12	14

0.88

With 12% discount PTP	0800 to 0900			1700 to 1800		
	IN	OUT	TOT	IN	OUT	TOT
Resi and Edu	118	440	558	426	239	665
Employment	12	3	16	2	11	12

Thornbury

Land Use	AM Peak			PM Peak		
	IN	OUT	TOT	IN	OUT	TOT
Dwellings	**60**	**154**	**214**	**143**	**89**	**233**
To Emp	*15*	*39*	*54*	*54*	*34*	*87*
To Shop	*2*	*6*	*8*	*17*	*11*	*28*
Leisure	*4*	*10*	*14*	*37*	*23*	*60*
Edu	*30*	*77*	*108*	*6*	*4*	*10*
Other	*8*	*22*	*30*	*29*	*18*	*47*
Employment	**15**	**4**	**20**	**2**	**13**	**16**
Primary Education	**0**	**0**	**0**	**0**	**0**	**0**
Secondary Education	**0**	**0**	**0**	**0**	**0**	**0**
Care Home	**0**	**0**	**0**	**0**	**0**	**0**
TOTAL	**76**	**158**	**234**	**146**	**103**	**249**
To Emp	*25%*	*25%*	*25%*	*37%*	*37%*	*37%*
To Shop	*4%*	*4%*	*4%*	*12%*	*12%*	*12%*
Leisure	*6%*	*6%*	*6%*	*26%*	*26%*	*26%*
Edu	*50%*	*50%*	*50%*	*4%*	*4%*	*4%*
Other	*14%*	*14%*	*14%*	*20%*	*20%*	*20%*

INTERNALISATION

Land Use	AM Peak			PM Peak		
	IN	OUT	TOT	IN	OUT	TOT
Dwellings	**-5**	**-2**	**-6**	**-7**	**-12**	**-19**
To Emp	*0*	*-2*	*-2*	*-1*	*0*	*-2*
To Shop	*0*	*-1*	*-2*	*-3*	*-2*	*-6*
Leisure	*-1*	*-2*	*-3*	*-7*	*-5*	*-12*
Edu	*0*	*0*	*0*	*0*	*0*	*0*
Other						
Employment	**-2**	**0**	**-2**	**0**	**-1**	**-2**
Primary Education	**0**	**0**	**0**	**0**	**0**	**0**
Secondary Education				**0**	**0**	**0**
Care Home						
TOTAL	**-6**	**-2**	**-8**	**-7**	**-14**	**-21**

EXTERNAL

Land Use	AM Peak			PM Peak		
	IN	OUT	TOT	IN	OUT	TOT
Dwellings	**55**	**152**	**208**	**136**	**77**	**214**
To Emp	*15*	*38*	*52*	*52*	*33*	*86*
To Shop	*2*	*5*	*7*	*14*	*9*	*23*
Leisure	*3*	*8*	*11*	*30*	*18*	*48*
Edu	*30*	*77*	*108*	*6*	*4*	*10*
Other	*8*	*22*	*30*	*29*	*18*	*47*
Employment	**14**	**4**	**18**	**2**	**12**	**14**
Primary Education	**0**	**0**	**0**	**0**	**0**	**0**
Secondary Education	**0**	**0**	**0**	**0**	**0**	**0**
Care Home	**0**	**0**	**0**	**0**	**0**	**0**
TOTAL	**69**	**156**	**226**	**138**	**89**	**228**

TOTAL External	0800 to 0900			1700 to 1800		
	IN	OUT	TOT	IN	OUT	TOT
Resi and Edu	55	152	208	136	77	214
Employment	14	4	18	2	12	14

0.92

With 8% discount PTP	0800 to 0900			1700 to 1800		
	IN	OUT	TOT	IN	OUT	TOT
Resi and Edu	51	140	191	125	71	196
Employment	13	4	16	2	11	13

Yate

Land Use	AM Peak			PM Peak		
	IN	OUT	TOT	IN	OUT	TOT
Dwellings	**120**	**308**	**428**	**287**	**179**	**466**
To Emp	*31*	*78*	*109*	*107*	*67*	*175*
To Shop	*5*	*12*	*17*	*35*	*22*	*57*
Leisure	*8*	*20*	*27*	*74*	*46*	*120*
Edu	*60*	*155*	*215*	*12*	*8*	*20*
Other	*17*	*43*	*60*	*58*	*36*	*94*
Employment	**93**	**26**	**119**	**15**	**80**	**94**
Primary Education	**58**	**41**	**99**	**6**	**9**	**14**
Secondary Education	**0**	**0**	**0**	**0**	**0**	**0**
Care Home	**0**	**0**	**0**	**0**	**0**	**0**
TOTAL	**271**	**375**	**646**	**307**	**267**	**574**
To Emp	*25%*	*25%*	*25%*	*37%*	*37%*	*37%*
To Shop	*4%*	*4%*	*4%*	*12%*	*12%*	*12%*
Leisure	*6%*	*6%*	*6%*	*26%*	*26%*	*26%*
Edu	*50%*	*50%*	*50%*	*4%*	*4%*	*4%*
Other	*14%*	*14%*	*14%*	*20%*	*20%*	*20%*

INTERNALISATION

Land Use	AM Peak			PM Peak		
	IN	OUT	TOT	IN	OUT	TOT
Dwellings	**-62**	**-38**	**-100**	**-20**	**-37**	**-56**
To Emp	*-3*	*-9*	*-12*	*-8*	*-1*	*-9*
To Shop	*-1*	*-2*	*-3*	*-7*	*-4*	*-11*
Leisure	*-2*	*-4*	*-5*	*-15*	*-9*	*-24*
Edu	*-33*	*-46*	*-79*	*-7*	*-5*	*-12*
Other						
Employment	**-9**	**-3**	**-12**	**-1**	**-8**	**-9**
Primary Education	**-46**	**-33**	**-79**	**-5**	**-7**	**-12**
Secondary Education				**0**	**0**	**0**
Care Home						
TOTAL	**-117**	**-73**	**-191**	**-26**	**-52**	**-77**

EXTERNAL

Land Use	AM Peak			PM Peak		
	IN	OUT	TOT	IN	OUT	TOT
Dwellings	**59**	**270**	**328**	**267**	**142**	**409**
To Emp	*28*	*69*	*97*	*100*	*66*	*165*
To Shop	*4*	*10*	*13*	*28*	*17*	*45*
Leisure	*6*	*16*	*22*	*59*	*37*	*96*
Edu	*28*	*108*	*136*	*5*	*3*	*8*
Other	*17*	*43*	*60*	*58*	*36*	*94*
Employment	**84**	**23**	**107**	**13**	**72**	**85**
Primary Education	**12**	**8**	**20**	**1**	**2**	**3**
Secondary Education	**0**	**0**	**0**	**0**	**0**	**0**
Care Home	**0**	**0**	**0**	**0**	**0**	**0**
TOTAL	**154**	**301**	**455**	**281**	**216**	**497**

TOTAL External	0800 to 0900			1700 to 1800		
	IN	OUT	TOT	IN	OUT	TOT
Resi and Edu	70	278	348	268	144	412
Employment	84	23	107	13	72	85

0.92

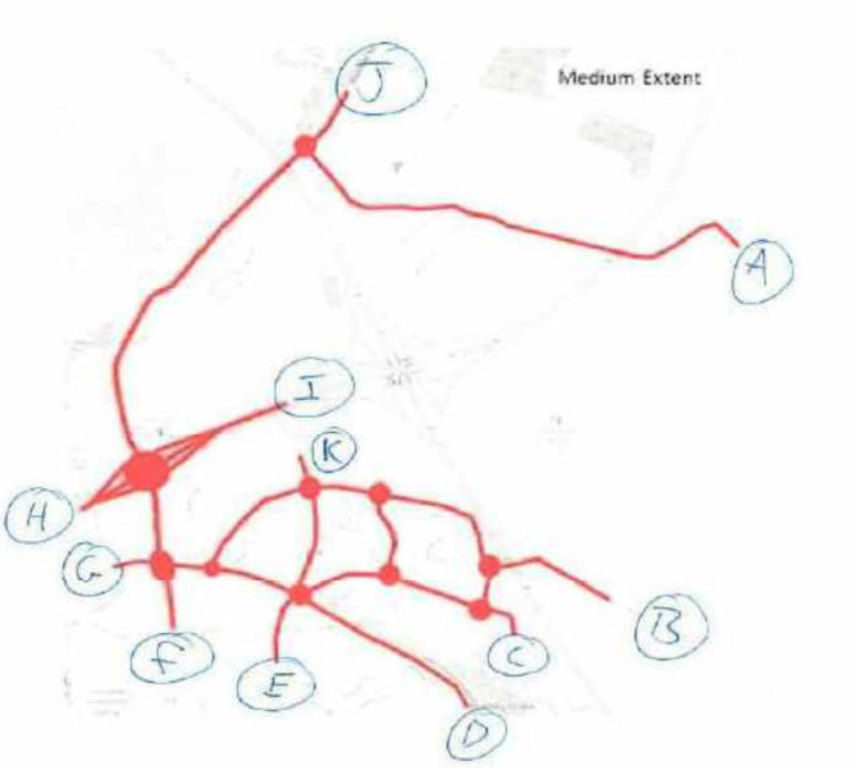
With 8% discount PTP	0800 to 0900			1700 to 1800		
	IN	OUT	TOT	IN	OUT	TOT
Resi and Edu	65	256	320	247	132	379
Employment	77	21	98	12	66	78

APPENDIX C: DISTRIBUTION

Charfield Distribution

Resi		From I	
	To		
	A	0	0%
	B	0	0%
	C	0	0%
	D	12	0%
	E	8	0%
	F	93	4%
	G	54	2%
	H	193	8%
	I	0	0%
	J	0	0%
	K	36	1%
		2541	

Employ		To I	
	From		
	A	0	0%
	B	0	0%
	C	0	0%
	D	6	0%
	E	3	0%
	F	468	13%
	G	5	0%
	H	1023	29%
	I	0	0%
	J	0	0%
	K	2	0%
		3573	



Resi		To										
		A	B	C	D	E	F	G	H	I	J	K
From	A									0%		
	B									0%		
	C									0%		
	D									0%		
	E									0%		
	F									4%		
	G									2%		
	H									8%		
	I		0%	0%	0%	0%	4%	2%	8%	0%	0%	1%
	J									0%		
	K									1%		

Employ		To										
		A	B	C	D	E	F	G	H	I	J	K
From	A									0%		
	B									0%		
	C									0%		
	D									0%		
	E									0%		
	F									13%		
	G									0%		
	H									29%		
	I		0%	0%	0%	0%	13%	0%	29%	0%		
	J									0%		
	K									0%		

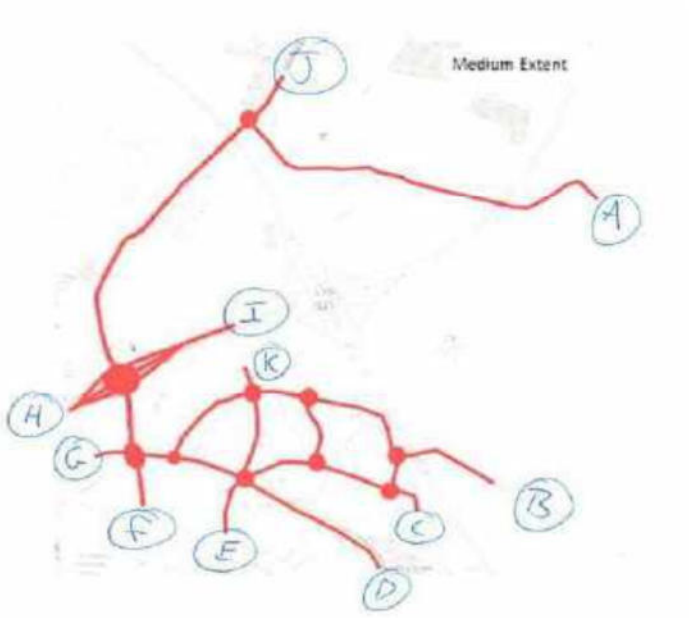
Coal Pit Heath Distribution

Resi

To		J	From A	B	D	I	
A	0	0%					
B	0	0%					
C	0	0%					
D	0	0%					
E	0	0%					
F	0	0%					
G	179	5%			2%	2%	
H	349	9%					9%
I	0	0%					
J	0	0%					
K	110	3%			3%		
	3840						

Employ

from		J	TO A	B	D	I	
A	0	0%					
B	0	0%					
C	0	0%					
D	0	0%					
E	0	0%					
F	0	0%					
G	5	0%			0%		
H	106	7%					7%
I	0	0%					
J	0	0%					
K	2	0%			0%		



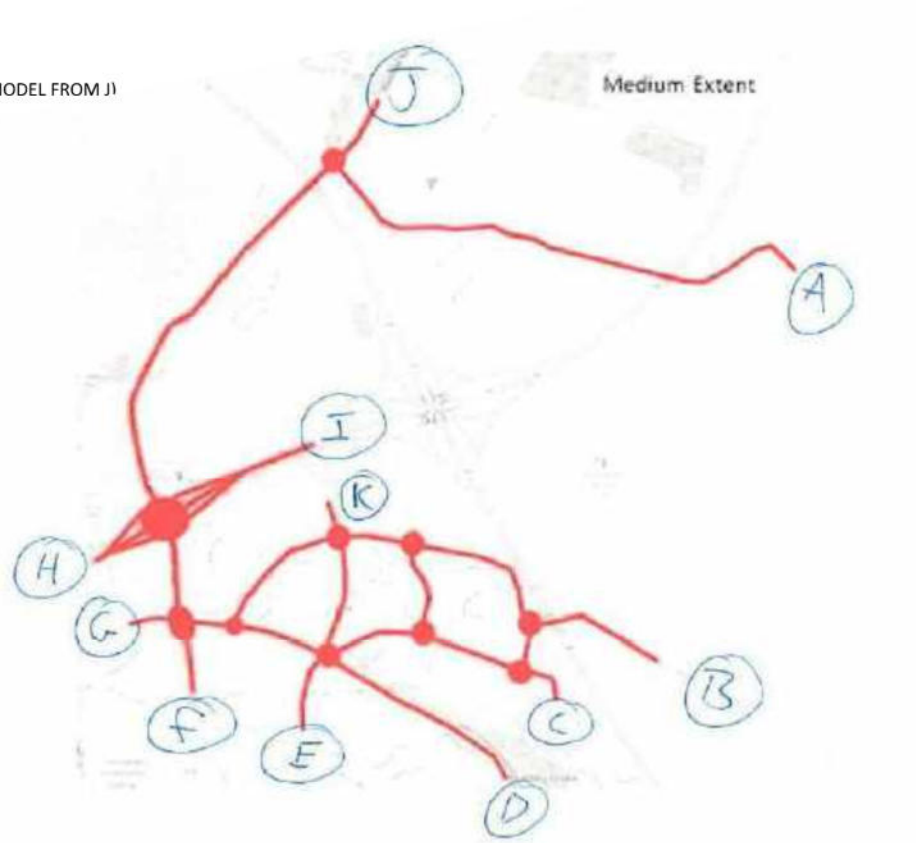
Resi	To											
		A	B	C	D	E	F	G	H	I	J	K
From	A											
	B							2%				3%
	C											
	D							2%				
	E											
	F											
	G		2%		2%							
	H									9%		
	I								9%			
	J											
	K		3%									

Employ	To											
		A	B	C	D	E	F	G	H	I	J	K
From	A											
	B							0%				0%
	C											
	D							0%				
	E											
	F											
	G		0%		0%							
	H									7%		
	I								7%			
	J											
	K		0%									

Thornbury Distribution

Resi	(ENTERING MODEL FROM J)
A	0%
B	0%
C	0%
D	1%
E	0%
F	5%
G	3%
H	12%
I	26%
J	0%
K	2%

Employ	From J
A	0%
B	0%
C	0%
D	2%
E	0%
F	4%
G	2%
H	11%
I	20%
J	0%
K	3%

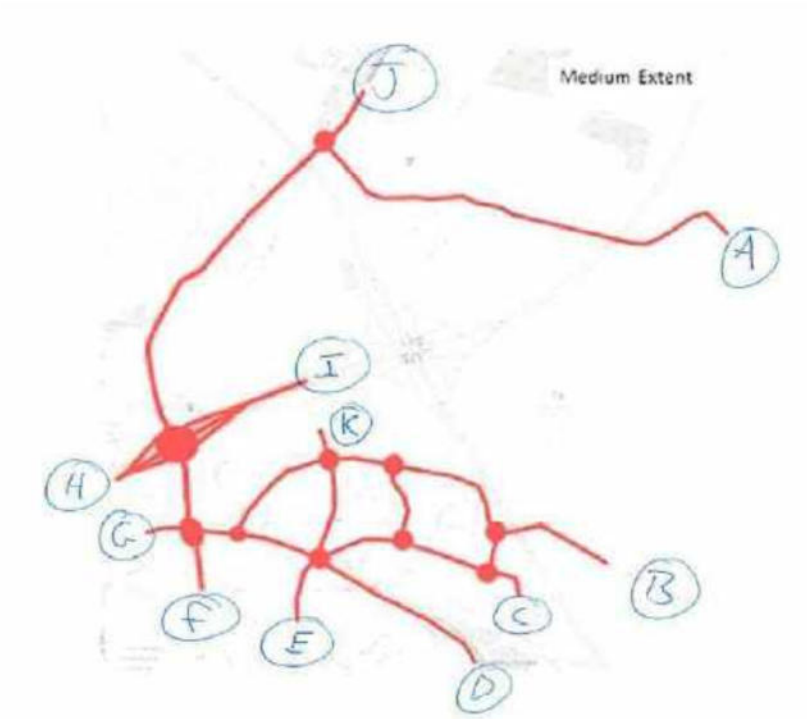


Resi		To										
		A	B	C	D	E	F	G	H	I	J	K
From	A										0%	
	B										0%	
	C										0%	
	D										1%	
	E										0%	
	F										5%	
	G										3%	
	H										12%	
	I										26%	
	J	0%	0%	0%	1%	0%	5%	3%	12%	26%	0%	2%
	K										2%	

Resi		To										
		A	B	C	D	E	F	G	H	I	J	K
From	A										0%	
	B										0%	
	C										0%	
	D										2%	
	E										0%	
	F										4%	
	G										2%	
	H										11%	
	I										20%	
	J	0%	0%	0%	2%	0%	4%	2%	11%	20%	0%	3%
	K										3%	

Yate Distribution

Resi			From		
To		J	A	B	D
A	0	0%			
B	0	0%			
C	0	0%			
D	54	0%			0%
E	19	0%			0%
F	379	3%			3%
G	342	3%			3%
H	765	7%	7%		
I	0	0%			
J	0	0%			
K	253	2%			2%
	10987				
Employment			To		
From		J	A	B	
A	0	0			
B	0	0			
C	0	0			
D	7	0%			0%
E	4	0%			0%
F	1054	19%			19%
G	7	0%			0%
H	734	13%	13%		
I	0	0%			
J	0	0%			
K	3	0%			0%
	5481				



Resi	TO											
		A	B	C	D	E	F	G	H	I	J	K
FROM	A											
	B				0%	0%	3%	3%				2%
	C											
	D		0%					0%				
	E		0%									
	F		3%									
	G		3%		0%							
	H									0%	7%	
	I								0%			
	J								7%			
	K		2%									

Employ	To											
		A	B	C	D	E	F	G	H	I	J	K
FROM	A											
	B				0%	0%	19%	0%				0%
	C											
	D		0%					0%				
	E		0%									
	F		19%									
	G		0%		0%							
	H									0%	13%	
	I								0%			
	J								13%			
	K		0%									

APPENDIX D: MODEL OUTPUTS AND LMVR

vectos
microsimulation specialists

Woodlands Bristol VISSIM Model
Local Model Validation Report

July 2017

Cornwall Buildings, 45 Newhall Street, Birmingham B3 3QR www.vectos.co.uk
Registered address: Vectos Microsim Limited, 82 St John Street, London EC1M 4JN Company no. 9322829

Contents

1 INTRODUCTION 1

Background 1
Scope 1
Report Structure 3

2 MODEL SPECIFICATION & SURVEY DATA 4

Manual Classified Counts (MCC) 5
Automatic Traffic Counts (ATCs) 5
Journey Times 7
Video Footage 8

3 BASE MODEL DEVELOPMENT 9

Network Structure 9
Time Periods 10
Vehicle Speeds 10
Priority Rules & Conflict Areas 10
Signalised Junctions 11
Public Transport 11
Matrix Estimation 12
M5 Mainline Flows 14

4 MODEL CALIBRATION 16

Calibration Criteria 16
Turn and Link Count Calibration 17

5 MODEL VALIDATION 19

Link Validation 19
Journey Time Analysis 20

6 SUMMARY AND CONCLUSIONS 21

Figures

Figure 1: Model Extent 2
Figure 2: MCC and ATC Survey Locations 6
Figure 3: Surveyed Journey Time Routes 7
Figure 4: Network Extent 9
Figure 5: MIDAS Loop Locations 15

Tables

Table 1: Zone Numbers and Locations 13
Table 2: MIDAS Loop I.Ds 14
Table 3: Calibration Statistics Summary 18
Table 4: Link Validation Statistics Summary 19
Table 5. AM & PM Journey Time Validation Results 20

Appendices

Appendix A: Full Calibration & Validation Results

1 INTRODUCTION

Background

1.1 Vectos Microsim (VM) has been appointed by Vectos South (VS) to develop a new 2017 VISSIM Base model of M5 Junction 16 and the surrounding network which can be subsequently used to undertake development impact assessments in the locality.

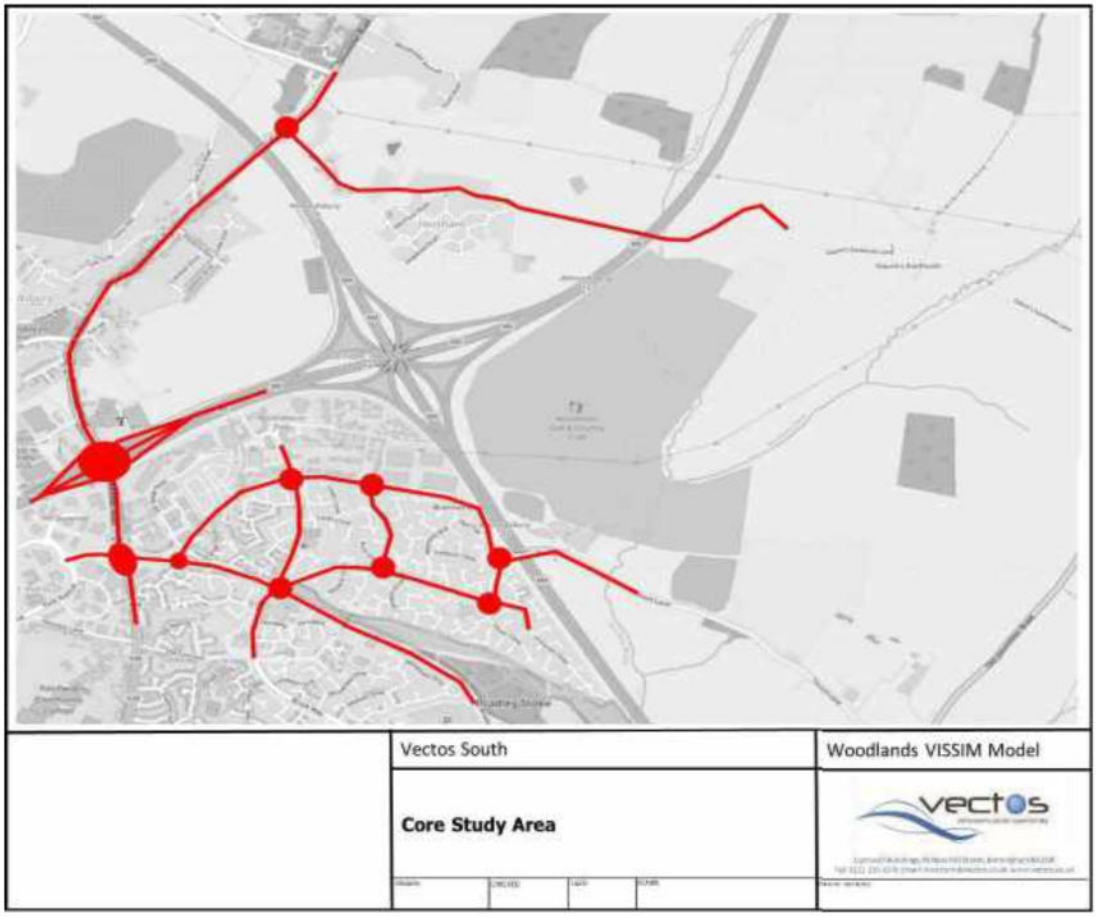
1.2 This report summarises the steps taken to develop the Base model and presents an assessment of the respective model calibration and validation in line with the study brief.

Scope

1.3 The model has been created using VISSIM version 9.00-07, and developed afresh using OS data provided by VS, and the background Bing maps add-on in VISSIM. The model includes M5 J16 and the Aztec West Roundabout just to the south as its central focal point, extending northwards to the A38 Gloucester Road/Hortham Lane junction and eastwards to Trench Lane.

1.4 The core study area of the model is illustrated in Figure 1 below:

Figure 1: Model Extent



Report Structure

1.5 The remainder of the report is set out as follows:

- Chapter 2 – Summarises the general model settings used in the resulting model, the assessment criteria adhered to in its development, and the observed data that was available and used in the model's development
- Chapter 3 – Summarises the VISSIM parameters used in model development, and the process of updating the previous 2008 Base to present day conditions
- Chapter 4 – Presents the model calibration assessments
- Chapter 5 – Presents the model validation assessments
- Chapter 6 – Provides a summary and the conclusions

2 MODEL SPECIFICATION & SURVEY DATA

2.1 The model has been developed and validated with the following specifications:

- **VISSIM Version**:
  - 9.00-07
- **Base Year**:
  - 2017
- **Simulation Periods (Evaluation Periods):**
  - AM: 07:30-09:30 (08:00-09:00)
  - PM: 16:30-18:30 (17:00-18:00)
- **Assignment Method:**
  - Dynamic Assignment
- **Assessment Criteria**
  - Network calibration assessed against observed 2017 Manual Classified Turn Counts (MCCs) at 10 junctions, and supporting video footage
  - Model validation assessed against 2017 ATC Link Count data at 6 bi-directional sites, and Journey Times surveys comprising 4 complete routes

2.2 The following data has been utilised in the development of the 2017 Base model.

Manual Classified Counts (MCC)

2.3 MCCs were undertaken by the survey company MHC Traffic Limited on Tuesday 13th June 2017 at the following locations:

- M5 East/A38 Gloucester
- A38 Gloucester Road/Bradley Stoke Way/Park Avenue
- Bradley Stoke Way/Pear Tree Road/Bowsland Way/Brook Way
- A38 Gloucester Road/Hortham Lane
- Bradley Stoke Way/Woodlands Lane
- Woodlands Lane/Great Park Road/Pear Tree Road
- Woodlands Lane/Foxfield Avenue
- Foxfield Avenue/Bowsland Way
- Trench Lane/Ormonds Close/Ellicks Close/Bowsland Way
- Woodlands Lane/Trench Lane

2.4 Data for all MCC site locations was collected at 15-minute intervals and disaggregated by vehicle type.

2.5 When processed these junction surveys equated to a total of 122 turning movements for each modelled peak hour. These turning movements were used to assess the relationship between modelled and observed flows during model calibration.

Automatic Traffic Counts (ATCs)

2.6 To supplement the MCCs, ATCs were also commissioned to ensure that the MCC counts taken on a single day were representative of flows across an extended weekly period. ATC data provides an independent check of the validity of the MCC counts.

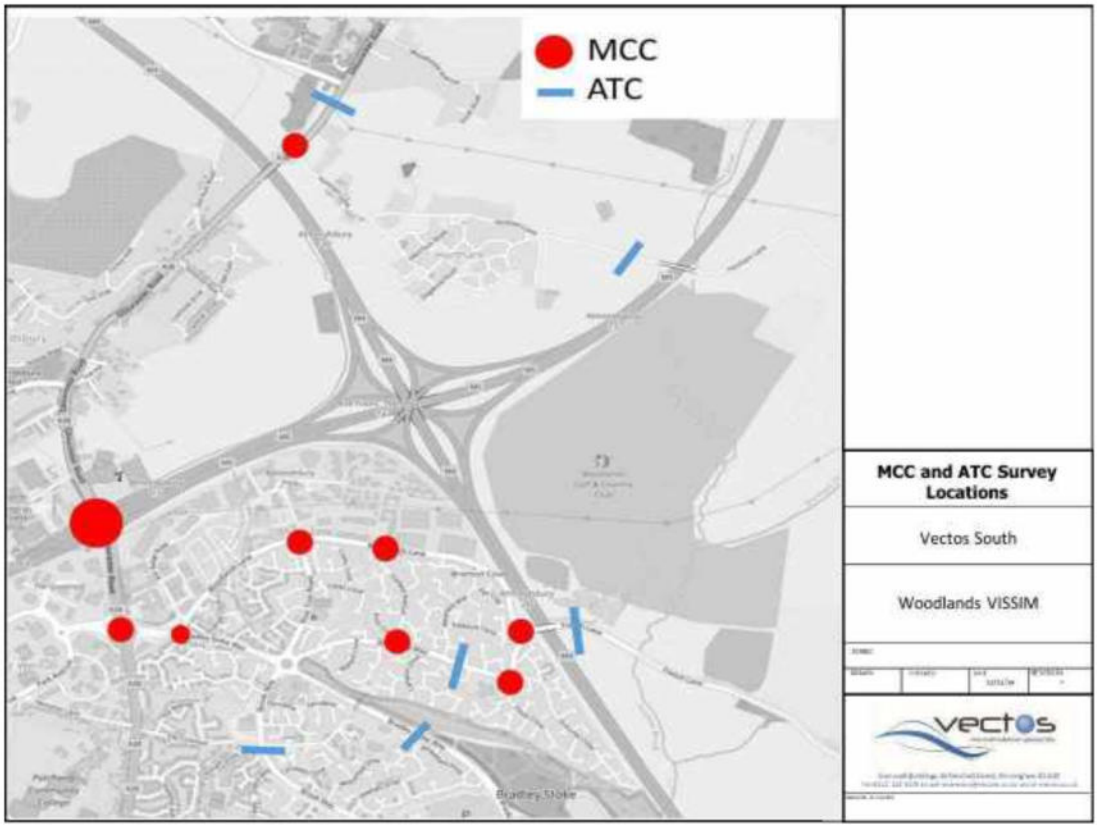
2.7 6 ATC sites were selected and surveyed by MHC Traffic across various different days in June, providing at least one week of data with which to derive average weekday traffic flows.

2.8 These sites are listed below:

- A38 Gloucester Road North
- Hortham Lane
- Trench Lane
- Bowsland Way
- Bradley Stoke Way
- Brook Way

2.9 The following figure presents the location of all MCC junction and ATC link counts:

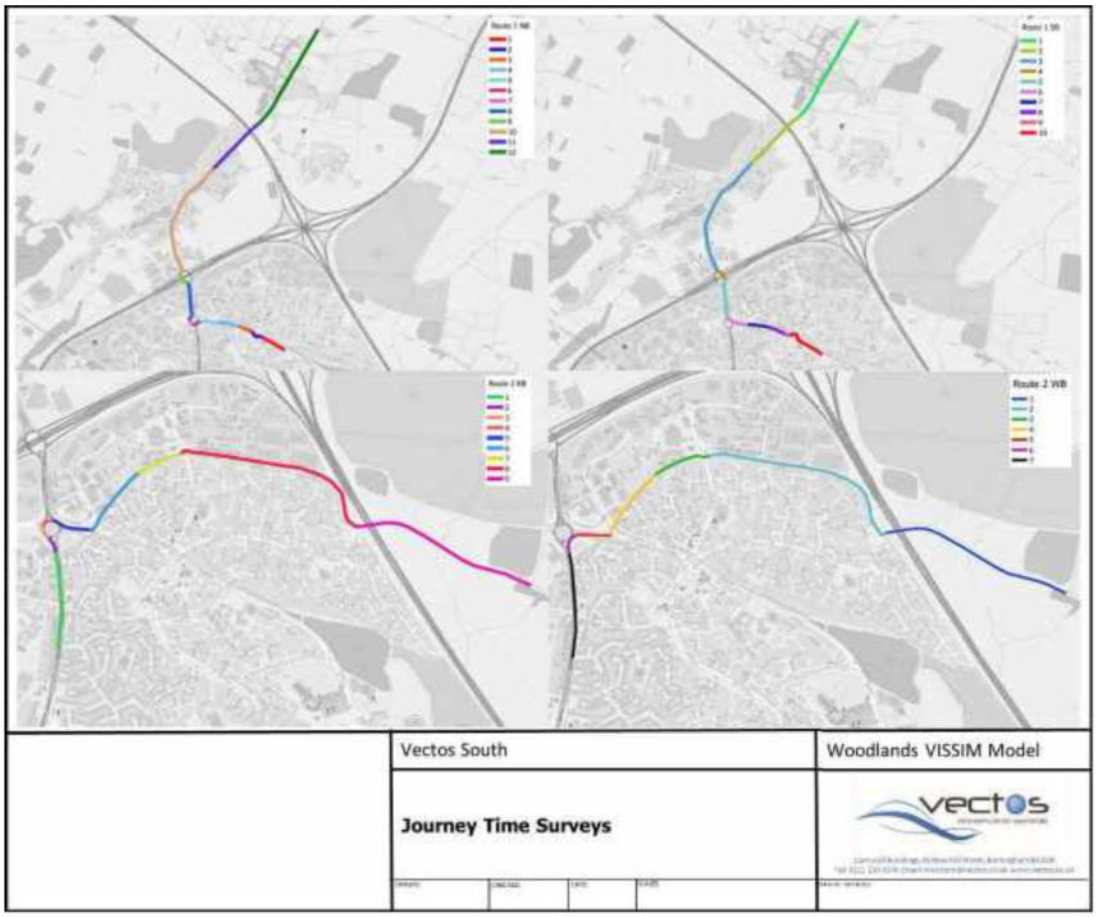
Figure 2: MCC and ATC Survey Locations



Journey Times

2.10 2017 Journey Times were also carried out by MHC Traffic Limited along 2 separate bi-directional routes, resulting in four complete journey time paths as illustrated in the Figure below:

Figure 3: Surveyed Journey Time Routes



2.11 Each of these routes is further sub-divided into sections, as shown in the image. The routes extend across the following:

- Route 1 Northbound: Bradley Stoke Way to A38 Gloucester Road North, via Aztec West Roundabout, M5 J16 and the Hortham Lane junction
- Route 1 Southbound: as above, in the reverse direction
- Route 2 Eastbound: A38 Gloucester Road South to Trench Lane, via Aztec West Roundabout and Woodlands Lane
- Route 2 Westbound: as above, in the reverse direction

Video Footage

2.12 Video surveys were also carried out at three primary junctions within the study area:

- M5 J16
- Aztec West Roundabout
- Bradley Stoke Way/Pear Tree Road/Bowsland Way/Brook Way

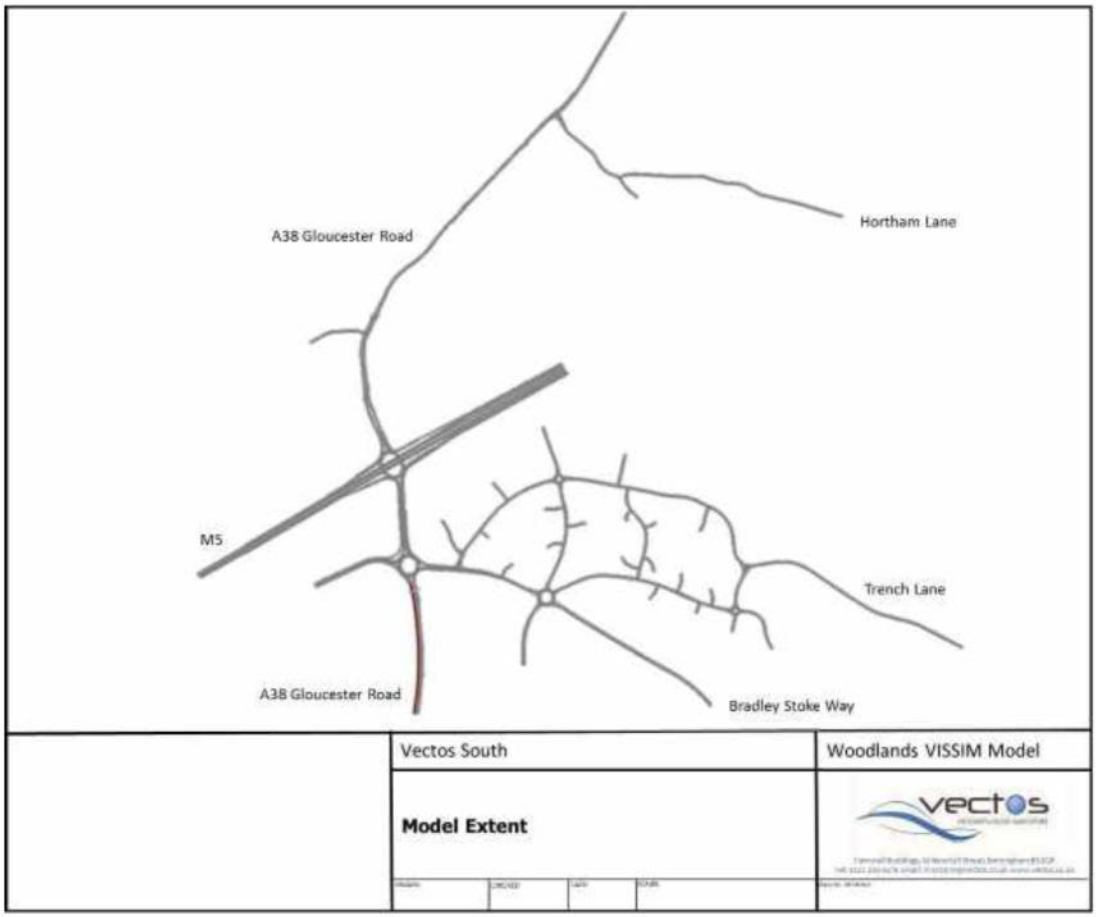
2.13 This footage was consulted during development of the Base model to ensure queue profiles and network geometry were representative of on street conditions.

3 BASE MODEL DEVELOPMENT

Network Structure

3.1 The general network extent is presented in Figure 6 below:

Figure 4: Network Extent



3.2 VM is aware that during the data collection period, roadworks were present at and around Aztec West Roundabout. For the purposes of base model development, and to ensure connection with survey data is maintained, the network was coded as per the network operation at the time the surveys were collected. It is accepted that this is likely to be different to the pre and post-roadworks network operation, but it does provide an accurate representation of the network through which the surveyed data has been obtained.

3.3 Should the Base model be used for model forecasting, the network should be reviewed in line with the expected alignment at the time of the forecast year and, if necessary, adjustments should be made to traffic demands to account for the constrained throughput resulting from the roadworks at the time the base model was developed.

Time Periods

3.4 The VISSIM model has been developed for AM and PM peak hours, with a 30 minute warm up and cool down period included before and after the peak. These peak hours were determined through analysis of the observed turn count data across the 3 hours provided for each peak period.

3.5 The model has been developed using 15-minute matrices to cover the entire model period. Each 15-minute time interval, for warm-up, peak and cool-down, includes a matrix for Light vehicles and a matrix for Heavies, informed mainly by the MCC survey counts. The process of matrix development is discussed in more detail in the *Matrix Estimation* section.

Vehicle Speeds

3.6 Desired speed decisions have been included at locations in the network where speed limit changes are enforced. The speed distribution curves that provide the range of speeds permitted for vehicles to travel within each speed limit bracket have been calculated through interrogation of DfT statistics of Free Flow Vehicle Speeds[1]. Speeds are applied on the basis of vehicle class (i.e. Heavy vehicles are subject to lower speed controls than Lights).

3.7 Other areas in the network, where localised speed changes are necessary (i.e. where curves in road geometry/approaches to junctions would require vehicles to reduce speeds), are controlled by reduced speed areas, which temporarily reduce a vehicle's desired speed. Again the distribution curves that inform these speeds are calculated by DfT statistics, and the speeds included are 1) based on sensible estimations of a vehicle's speed on a particular area of the network, and 2) used as a calibration tool to ensure realistic throughput at junction approaches, as noted in MCC counts and video footage, is reflected within the model.

Priority Rules & Conflict Areas

3.8 Priority Rules and/or Conflict Areas have been included at all give-way junctions and priority controlled roundabouts to ensure vehicle movements through and around junctions are realistic and that 'vehicle crossover' in the model is limited.

[1] Dft, *Vehicle free flow speeds by road type and vehicle type in Great Britain: 2015,* June 2016, Table SPE0111

3.9 Priority rules were also added at specific locations to represent yellow boxes and courtesy let-in behaviour. This enables the model to accurately reflect on-street driving etiquette at heavily-congested locations where vehicles will often allow space in front to prevent blocking a junction, whilst also helping to minimise the possibility of the network locking up.

Signalised Junctions

3.10 The model extent includes five signalised junctions:

- M5 J16
- Aztec West Roundabout
- Bradley Stoke Way/Woodlands Lane
- A38 Gloucester Road/Hortham Lane
- Bradley Stoke Way/Orchard Gate

3.11 For the first three junctions, LinSig models provided the necessary intergreens and signal staging. Green times for each phase within a junction were adjusted as part of the model calibration process; video footage shows that on-street, green times for these signals are reactive to demand and so LinSig times should not be applied too rigidly.

3.12 The A38 Gloucester Road/Hortham Lane junction signal times were informed by video footage, which provided the staging of the junction. Again on street this junction operates on variable demand times but for the purposes of the VISSIM model, fixed time signals were included using average green times across the junction. For the final junction, a realistic signal plan was devised by VM to replicate the operation on street.

Public Transport

3.13 A review of public transport provision across the network was carried out to ensure all bus routes were represented within the modelling. The following bus routes are all represented in the model:

- 77
- 78/79
- S7C
- 73
- 963

3.14 Online timetables were used to identify predominant bus routes through the network, and to generate start times for these routes. These were then cross-checked with bus turn counts recorded in the classified turn counts and timetables were adjusted accordingly.

Matrix Estimation

3.15 MCC data formed the basis for the matrix estimation process, as these provide the counts that need to be matched in the model in order to achieve model calibration. As VISSIM does not include a built-in matrix estimation module that can be used to automatically calculate matrices based on desired link and/or turn counts, this was carried out through spreadsheet calculations which involved a series of processes designed to create realistic O-D patterns using only junction turn count data and land use observations.

3.16 Firstly, MCC data was processed to give 15-minute counts for all junctions. Many of these surveys are located at the edge of the model extent, meaning that certain O-D movements are known (as the origin and destination zones are both external to the network). These counts were maintained through the matrix estimation process.

3.17 All remaining O-D movements were calculated proportionally based on successive turning movement proportions, meaning that a total count from a particular zone is distributed across all remaining zones in the network. Due to the route choice within the model, the shortest route was assumed as the contributor to each O-D movement.

3.18 As there are multiple route possibilities through the network, and trips may start and/or end at other areas within the network that have not been surveyed, additional zones were added into the network to produce and attract trips elsewhere in the network.

3.19 The total list of zones included in the network is as follows:

Table 1: Zone Numbers and Locations

Zone Number	Location	Surveyed?
1	A38 Gloucester Road (East)	Yes
2	Hortham Lane	Yes
3	M5 (East)	Yes
4	M5 (West)	Yes
5	Park Avenue	Yes
6	A38 Gloucester Road (South)	Yes
7	Brook Way	Yes
8	Bradley Stoke Way (East)	Yes
9	Great Park Road	Yes
10	Ellicks Close	Yes
11	Ormonds Close	Yes
12	Trench Lane (East)	Yes
13	Over Lane	No
14	Woodlands Park	No
15	Orchard Gate	No
16	Ottrells Mead/Cooks Close/Apseleys Mead	No
17	Badgers Close/Warren Close/Foxborough	No
18	Business Park	No
19	Westfield Way North	No
20	Westfield Way South	No
22	Hickory Lane	No

3.20 Total vehicle numbers beginning or ending their trip at an un-surveyed zone were informed by a) the land use and estimated trip numbers associated to that zone, and b) known in/out trips necessary to make up any shortfall or reduce trip numbers between upstream and downstream junctions, identified through the development of an hourly schematic diagram of the network.

3.21 For example, A38 Gloucester Road/Hortham Lane junction and M5 J16 were both surveyed. It is therefore known the southbound A38 movements from the Hortham Lane junction, and the southbound A38 movements approaching the M5 J16 junction. Any difference between these values will be the result of the un-surveyed junctions in-between, either removing or adding trips to the link. In this case, the assumed largest contributor to this (Over Lane) was coded into the model (Zone number 13) and realistic in/out trip numbers were included to assist the calibration of both Hortham Lane and M5 J16 junctions.

3.22 Large residential areas in the middle of the network (between Woodlands Lane and Bradley Stoke Way/Bowsland Way) were also included to ensure a more realistic model operation, ensuring trips passing through Pear Tree Road and Foxfield Avenue were not only external through trups, but also trips originating at the surrounding residential streets.

3.23 Employment centres at the west (off Ash Ridge Road) and the north of Woodlands Lane were also included.

3.24 Distribution for these un-surveyed zones were informed using the same process of proportional turn counts, ensuring that all resulting O-D movements were realistic (i.e. residential to residential and employment to employment trips were restricted to prevent artificial 'trip-dumping').

3.25 The final stage of the matrix estimation process involved the application of some global factors to account for some trips getting lost in the turn count proportion methodology (because of the numerous routes open to vehicles), and some manual adjustments of specific O-D absolute values where considered necessary to meet turn count calibration targets.

M5 Mainline Flows

3.26 MCC counts provided the numbers of vehicles on the M5 on and off-slips at Junction 16, but not the mainline flows passing through the junction. To inform these flows, Highways England (HE) online database WebTRIS was explored.

3.27 The database holds 15-minute vehicular flows for various locations between January 2017-April 2017. These were processed to filter out weekend results to provide average 15-minute flows for both AM and PM peak hours at the following three locations:

Table 2: MIDAS Loop I.Ds

Number	Location	MIDAS Loop I.D.	Grid Reference
1	**Northbound within M5 J16**	M5/8325B	360475 , 183183
2	**Northbound (continuing)**	M5/8315B	361376 , 183646
3	**Southbound within M5 J16**	M5/8324A	360566 , 183214

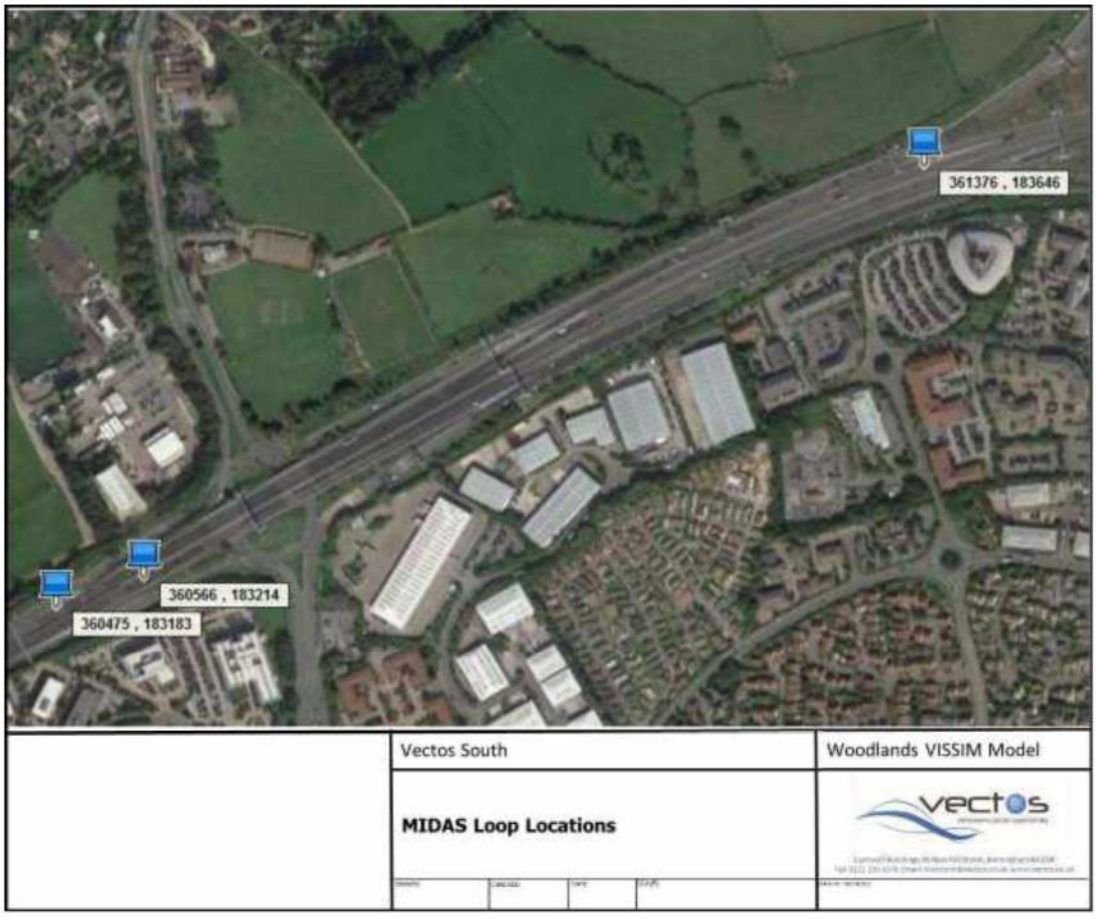
1. Northbound within M5 J16 – this provided the total vehicle numbers passing through the junction. This, plus the total vehicle numbers on M5 J16 eastbound off-slip as informed by the MCC, equals the originating zone total for M5 West zone (no.4)

2. Northbound (continuing) – this provided the total trip numbers continuing through both J15 and J16 on M5 mainline (i.e. not using the northbound distributor that allows vehicles to exit the mainline at J16). In turn, this provided the vehicle numbers that *do* use the distributor (by subtracting this value from Loop I.D. 8325B).

3. Southbound within M5 J16 – this provided the total vehicle numbers passing through the junction in a southbound direction.

3.28 The MIDAS loops used are shown in the Figure below:

Figure 5: MIDAS Loop Locations



4 MODEL CALIBRATION

Calibration Criteria

4.1 Flow calibration is a process whereby modelled flow outputs are compared to the equivalent observed traffic flows across the network.

4.2 The Geoffrey E. Havers (GEH) statistic is a standard way of comparing the observed and modelled flows, as defined in DMRB, Volume 12, Chapter 4. The GEH value is similar to a chi-squared test and also incorporates both relative and absolute errors in order to give an overall measure of the accuracy of the modelled flow.

4.3 The GEH statistic has the benefit of removing bias that exists when comparing flows of different magnitudes using percentages, such that a difference of 10 in a flow of 100 vehicles per hour (vph) is less significant (GEH = 1) than a difference of 100 in a flow of 1000 vph (GEH = 3.2).

4.4 The GEH statistic is calculated by:

$$GEH = \sqrt{\frac{(M-C)^2}{(M+C)/2}}$$

where:

GEH = GEH statistic

M = Modelled flow

C = Observed flow

4.5 Dft guidance indicates that the GEH statistics should be less than 5.0 for 85% of comparisons between observed and modelled hourly flows.

4.6 Furthermore, the difference between observed and modelled link flows is also examined. DfT provides guidance for acceptable absolute or percentage differences in observed vehicles per hour (vph) in DMRB as follows:

- For observed flows < 700 vph, modelled flow within 100 vph of observed flow
- For observed flows 700-2,700 vph, modelled flow within 15% of observed flow
- For observed flows > 2,700 vph, modelled flow within 400 vph of observed flow

4.7 Again, 85% of hourly flows should be within this criteria.

Turn and Link Count Calibration

4.8 10 MCC sites were used to inform the development of the demand matrices and are therefore used to inform calibration of the network. This provided a total calibration target of 122 counts.

4.9 The full set of AM and PM turn and link count calibration results can be found in Appendix A.

4.10 A summary of the calibration results for all peak periods and for all datasets is provided in the table overleaf:

Table 3: Calibration Statistics Summary

Turn Count Calibration (GEH)				
	AM		PM	
Counts	122		301	
	Pass	%	Pass	%
<3	102	83.6%	101	82.8%
<4	113	92.6%	114	93.4%
<5	118	96.7%	119	97.5%
<6	121	99.2%	122	100.0%
<7	121	99.2%	122	100.0%
<8	121	99.2%	122	100.0%
<9	122	100.0%	122	100.0%
Link Flow Calibration				
	AM		PM	
Counts	72		72	
<700 veh	*within 100*		*within 100*	
pass	47	100.0%	49	100.0%
fail	0	0.0%	0	0.0%
700-2700	*<15%*		*<15%*	
pass	23	100.0%	23	100.0%
fail	0	0.0%	0	0.0%
>2700 vehs	*within 400*		*within 400*	
pass	2	-	0	-
fail	0	-	0	-
TOTAL				
pass	72	100.0%	72	100.0%
fail	0	0.0%	0	0.0%
Summary				
	AM		PM	
Turn GEH<5	96.7%		97.5%	
Link Flow	100.0%		100.0%	

4.11 The results show that both AM and PM models surpass DMRB standards in regards to turn and link flow calibration. These measures combined demonstrate that the model is accurately representing turn movements at each junction, and link flows on approaches and exits to these junctions.

5 MODEL VALIDATION

Link Validation

5.1 As described in Chapter 2, a number of sites were available for which link count data could be used for the purposes of validation. As these datasets were not used during the matrix development process they can be used to provide an independent check of modelled flows.

5.2 The table below provides a summary of AM and PM peak hour link flow validation statistics:

Table 4: Link Validation Statistics Summary

Link Validation (GEH)				
	AM		PM	
Counts	12		12	
	Pass	%	Pass	%
<3	8	66.7%	9	75.0%
<4	10	83.3%	12	100.0%
<5	12	100.0%	12	100.0%
<6	12	100.0%	12	100.0%
<7	12	100.0%	12	100.0%
<8	12	100.0%	12	100.0%
<9	12	100.0%	12	100.0%
<10	12	100.0%	12	100.0%
Link Flow Validation				
	AM		PM	
<700 veh	*within 100*		*within 100*	
pass	10	100.0%	9	100.0%
fail	0	0.0%	0	0.0%
700-2700	*<15%*		*<15%*	
pass	2	100.0%	3	100.0%
fail	0	0.0%	0	0.0%
>2700 vehs	*within 400*		*within 400*	
pass	0	-	0	-
fail	0	-	0	-
TOTAL				
pass	12	100.0%	12	100.0%
fail	0	0.0%	0	0.0%
Summary				
	AM		PM	
GEH<5	100.0%		100.0%	
Flow	100.0%		100.0%	

5.3 Both AM and PM link validation results show that 100% of the 12 link counts (6 locations, 2 directions) exhibit a GEH of less than 5 and meet DfT's link flow criteria. As a result both models can be considered to be well validated to observed link flows.

Journey Time Analysis

5.4 As identified in Chapter 2, journey time surveys were carried out along four separate routes. TAG Unit M3.1 outlines that for 85% of the modelled routes, the difference between the observed and modelled journey times should not be more than 15% (or 1 minute, if higher).

5.5 The table below details the AM and PM journey time results for each journey time section:

Table 5. AM & PM Journey Time Validation Results

		AM				PM			
I.D	**Description**	**Obs.**	**Mod.**	**Diff**	**Pass?**	**Obs.**	**Mod.**	**Diff**	**Pass?**
Route 1 NB	Bradley Stoke Way to A38 Gloucester Road North	485	496	11	Pass	421	473	52	Pass
Route 1 SB	A38 Gloucester Road North to Bradley Stoke Way	494	534	39	Pass	458	437	21	Pass
Route 2 EB	A38 Gloucester Road South to Trench Lane	354	409	55	Pass	364	371	6	Pass
Route 2 WB	Trench Lane to A38 Gloucester Road South	396	377	19	Pass	471	402	69	Pass

5.6 The results above show that in both AM and PM models, 100% of the journey time sections validate to within TAG criteria highlighted above.

5.7 Each full route presented above is broken down further into journey time sections (as detailed in Figure 3). Full results for each section can be found in Appendix A. Results show that based on DMRB criteria, all individual sections also adhere to standards).

6 SUMMARY AND CONCLUSIONS

6.1 Vectos Microsim (VM) has been appointed by Vectos South (VS) to create a new 2017 VISSIM Base model of M5 J16 and the surrounding network in order to provide the foundation for development testing in the area.

6.2 The model has been developed using VISSIM version 9.00-07, and includes M5 J16, Aztec West Roundabout at the centre, stretching westwards to Bradley Stoke Way, Woodlands Lane and Trench Lane and northwards to the junction between A38 Gloucester Road and Hortham Lane.

6.3 The model has drawn upon a large pool of observed data including MCC turn counts, ATC link counts, surveyed journey time data and video footage.

6.4 The results presented in this document demonstrate that the modelled outputs correlate closely with all of the above datasets and as a result, all models can be considered to be robust tools with which to test any future year scheme appraisal or development impact assessment.

Appendix A

Junction No.	Junction Description	From Arm	To Arm	08:00-09 :00									08:00-09 :00				
				Observed			Modelled			GEH			TOTAL VEHICLES SUMMARY				
				Lights	Heavies	Buses	Lights	Heavies	Buses	Lights	Heavies	Buses	Observed	Modelled	Difference	%	GEH
Site 1	M5 East / A38 Gloucester	M5 (East)	A38 Gloucester Road (South)	1808	29	3	1734	35	0	1.8	1.1	2.4	1840	1769	-71	4%	1.7
Site 1	M5 East / A38 Gloucester	M5 (East)	M5 (West)	3	0	0	0	0	0	2.4	0.0	0.0	3	0	-3	100%	2.4
Site 1	M5 East / A38 Gloucester	M5 (East)	A38 Gloucester Road (North)	218	14	0	227	6	0	0.6	2.5	0.0	232	233	1	0%	0.1
Site 1	M5 East / A38 Gloucester	M5 (East)	M5 (East)	2	0	0	2	0	0	0.0	0.0	0.0	2	2	0	0%	0.0
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	M5 (West)	336	9	3	367	10	0	1.7	0.3	2.4	348	377	29	8%	1.5
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	A38 Gloucester Road (North)	363	4	14	366	8	16	0.2	1.6	0.5	381	390	9	2%	0.5
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	M5 (East)	431	23	4	452	14	0	1.0	2.1	2.8	458	466	8	2%	0.4
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	A38 Gloucester Road (South)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 1	M5 East / A38 Gloucester	M5 (West)	A38 Gloucester Road (North)	323	12	0	321	10	0	0.1	0.6	0.0	335	331	-4	1%	0.2
Site 1	M5 East / A38 Gloucester	M5 (West)	M5 (East)	18	0	0	0	0	0	6.0	0.0	0.0	18	0	-18	100%	6.0
Site 1	M5 East / A38 Gloucester	M5 (West)	A38 Gloucester Road (South)	821	14	0	772	19	0	1.7	1.2	0.0	835	791	-44	5%	1.5
Site 1	M5 East / A38 Gloucester	M5 (West)	M5 (West)	3	0	0	0	0	0	2.4	0.0	0.0	3	0	-3	100%	2.4
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	M5 (East)	201	10	0	191	15	0	0.7	1.4	0.0	211	206	-5	2%	0.3
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	A38 Gloucester Road (South)	546	4	11	514	12	11	1.4	2.8	0.0	561	537	-24	4%	1.0
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	M5 (West)	332	27	0	305	23	0	1.5	0.8	0.0	359	328	-31	9%	1.7
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	A38 Gloucester Road (North)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	A38 Gloucester Road (South)	231	4	7	228	1	3	0.2	1.9	1.8	242	232	-10	4%	0.6
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	Park Avenue	357	0	1	328	0	0	1.6	0.0	1.4	358	328	-30	8%	1.6
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	A38 Gloucester Road (North)	536	14	6	586	5	6	2.1	2.9	0.0	556	597	41	7%	1.7
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	Bradley Stoke Way	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	Park Avenue	325	1	6	324	0	0	0.1	1.4	3.5	332	324	-8	2%	0.4
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	A38 Gloucester Road (North)	476	16	9	481	21	10	0.2	1.2	0.3	501	512	11	2%	0.5
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	Bradley Stoke Way	304	4	6	266	0	5	2.3	2.8	0.4	314	271	-43	14%	2.5
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	A38 Gloucester Road (South)	59	0	0	54	0	0	0.7	0.0	0.0	59	54	-5	8%	0.7
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	A38 Gloucester Road (North)	115	5	6	114	6	0	0.1	0.4	3.5	126	120	-6	5%	0.5
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	Bradley Stoke Way	66	1	2	59	0	0	0.9	1.4	2.0	69	59	-10	14%	1.3
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	A38 Gloucester Road (South)	37	1	0	35	2	0	0.3	0.8	0.0	38	37	-1	3%	0.2
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	Park Avenue	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	Bradley Stoke Way	919	12	4	937	23	1	0.6	2.6	1.9	935	961	26	3%	0.8
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	A38 Gloucester Road (South)	913	30	8	824	31	9	3.0	0.2	0.3	951	864	-87	9%	2.9
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	Park Avenue	1345	4	2	1225	8	0	3.3	1.6	2.0	1351	1233	-118	9%	3.3
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	A38 Gloucester Road (North)	0	1	0	0	0	0	0.0	1.4	0.0	1	0	-1	100%	1.4
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Bowsland Way	7	0	0	15	0	0	2.4	0.0	0.0	7	15	8	114%	2.4
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Bradley Stoke Way (East)	55	0	0	93	0	0	4.4	0.0	0.0	55	93	38	69%	4.4
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Brook Way	60	0	2	93	0	0	3.8	0.0	2.0	62	93	31	50%	3.5
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Bradley Stoke Way (West)	72	2	0	50	0	0	2.8	2.0	0.0	74	50	-24	32%	3.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Pear Tree Road	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Bradley Stoke Way (East)	97	0	0	65	0	0	3.6	0.0	0.0	97	65	-32	33%	3.6
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Brook Way	74	1	5	50	0	4	3.0	1.4	0.5	80	54	-26	33%	3.2
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Bradley Stoke Way (West)	134	0	2	147	1	0	1.1	1.4	2.0	136	148	12	9%	1.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Pear Tree Road	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Bowsland Way	1	0	0	0	0	0	1.4	0.0	0.0	1	0	-1	100%	1.4
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Brook Way	21	0	0	16	0	0	1.2	0.0	0.0	21	16	-5	24%	1.2
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Bradley Stoke Way (West)	225	5	1	213	3	0	0.8	1.0	1.4	231	216	-15	6%	1.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Pear Tree Road	71	0	1	79	0	0	0.9	0.0	1.4	72	79	7	10%	0.8
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Bowsland Way	19	0	0	7	0	0	3.3	0.0	0.0	19	7	-12	63%	3.3
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Bradley Stoke Way (East)	2	1	0	0	0	0	2.0	1.4	0.0	3	0	-3	100%	2.4
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Bradley Stoke Way (West)	275	2	6	268	0	6	0.4	2.0	0.0	283	274	-9	3%	0.5
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Pear Tree Road	118	0	0	91	0	0	2.6	0.0	0.0	118	91	-27	23%	2.6
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Bowsland Way	40	0	4	55	0	4	2.2	0.0	0.0	44	59	15	34%	2.1
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Bradley Stoke Way (East)	18	0	0	16	0	0	0.5	0.0	0.0	18	16	-2	11%	0.5
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Brook Way	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Pear Tree Road	55	0	0	31	0	1	3.7	0.0	1.4	55	32	-23	42%	3.5
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Bowsland Way	25	0	0	3	0	0	5.9	0.0	0.0	25	3	-22	88%	5.9
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Bradley Stoke Way (East)	222	4	2	226	1	0	0.3	1.9	2.0	228	227	-1	0%	0.1
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Brook Way	99	2	2	89	0	1	1.0	2.0	0.8	103	90	-13	13%	1.3
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Bradley Stoke Way (West)	3	1	0	0	0	0	2.4	1.4	0.0	4	0	-4	100%	2.8
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (East)	Hortham Lane	36	0	1	41	0	0	0.8	0.0	1.4	37	41	4	11%	0.6
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (East)	A38 Gloucester Road (West)	819	40	10	815	53	11	0.1	1.9	0.3	869	879	10	1%	0.3
Site 4	A38 Gloucester Road / Hortham Lane	Hortham Lane	A38 Gloucester Road (West)	204	1	1	192	0	0	0.9	1.4	1.4	206	192	-14	7%	1.0
Site 4	A38 Gloucester Road / Hortham Lane	Hortham Lane	A38 Gloucester Road (East)	84	0	2	87	0	0	0.3	0.0	2.0	86	87	1	1%	0.1
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (West)	A38 Gloucester Road (East)	809	27	13	826	23	17	0.6	0.8	1.0	849	866	17	2%	0.6
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (West)	Hortham Lane	71	3	1	70	0	0	0.1	2.4	1.4	75	70	-5	7%	0.6
Site 5	Bradley Stoke Way / Woodlands Lane	Woodlands Lane	Bradley Stoke Way (East)	20	1	0	27	0	0	1.4	1.4	0.0	21	27	6	29%	1.2
Site 5	Bradley Stoke Way / Woodlands Lane	Woodlands Lane	Bradley Stoke Way (West)	383	8	5	409	3	3	1.3	2.1	1.0	396	415	19	5%	0.9
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (East)	Bradley Stoke Way (West)	741	10	9	724	4	6	0.6	2.3	1.1	760	734	-26	3%	1.0
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (East)	Woodlands Lane	18	0	0	43	1	0	4.5	1.4	0.0	18	44	26	144%	4.7
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (West)	Woodlands Lane	914	11	8	903	22	4	0.4	2.7	1.6	933	929	-4	0%	0.1
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (West)	Bradley Stoke Way (East)	375	6	4	365	1	2	0.5	2.7	1.2	385	368	-17	4%	0.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Pear Tree Road	75	0	0	15	0	0	8.9	0.0	0.0	75	15	-60	80%	8.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Woodlands Lane (West)	286	7	5	344	2	4	3.3	2.4	0.5	298	350	52	17%	2.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Great Park Road	164	1	0	201	0	0	2.7	1.4	0.0	165	201	36	22%	2.7
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Woodlands Lane (East)	1	0	0	0	0	0	1.4	0.0	0.0	1	0	-1	100%	1.4
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Woodlands Lane (West)	52	0	0	39	1	0	1.9	1.4	0.0	52	40	-12	23%	1.8
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Great Park Road	85	0	1	76	0	0	1.0	0.0	1.4	86	76	-10	12%	1.1
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Woodlands Lane (East)	84	0	0	96	0	1	1.3	0.0	1.4	84	97	13	15%	1.4
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Pear Tree Road	2	0	0	0	0	0	2.0	0.0	0.0	2	0	-2	100%	2.0
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Great Park Road	418	0	0	442	0	0	1.2	0.0	0.0	418	442	24	6%	1.2
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Woodlands Lane (East)	316	7	7	267	15	4	2.9	2.4	1.3	330	286	-44	13%	2.5
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Pear Tree Road	15	2	1	36	1	0	4.2	0.8	1.4	18	37	19	106%	3.6
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Woodlands Lane (West)	0	1	0	0	0	0	0.0	1.4	0.0	1	0	-1	100%	1.4
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Woodlands Lane (East)	10	0	0	3	0	0	2.7	0.0	0.0	10	3	-7	70%	2.7
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Pear Tree Road	27	0	1	52	0	0	4.0	0.0	1.4	28	52	24	86%	3.8
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Woodlands Lane (West)	25	1	0	25	0	0	0.0	1.4	0.0	26	25	-1	4%	0.2
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Great Park Road	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane East	Foxfield Avenue	4	0	0	0	0	0	2.8	0.0	0.0	4	0	-4	100%	2.8
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane East	Woodlands Lane West	662	9	5	643	2	4	0.7	3.0	0.5	676	649	-27	4%	1.0
Site 7	Woodlands Lane / Foxfield Avenue	Foxfield Avenue	Woodlands Lane West	34	0	0	43	0	0	1.5	0.0	0.0	34	43	9	26%	1.5
Site 7	Woodlands Lane / Foxfield Avenue	Foxfield Avenue	Woodlands Lane East	6	0	0	14	0	0	2.5	0.0	0.0	6	14	8	133%	2.5
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane West	Woodlands Lane East	161	5	7	138	9	5	1.9	1.5	0.8	173	152	-21	12%	1.6
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane West	Foxfield Avenue	4	0	0	8	0	0	1.6	0.0	0.0	4	8	4	100%	1.6
Site 8	Foxfield Avenue / Bowsland Way	Foxfield Avenue	Bowsland Way (East)	9	0	0	6	0	0	1.1	0.0	0.0	9	6	-3	33%	1.1
Site 8	Foxfield Avenue / Bowsland Way	Foxfield Avenue	Bowsland Way (West)	17	0	0	17	0	0	0.0	0.0	0.0	17	17	0	0%	0.0
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (East)	Bowsland Way (West)	253	1	7	243	1	4	0.6	0.0	1.3	261	248	-13	5%	0.8
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (East)	Foxfield Avenue	9	0	0	0	0	0	4.2	0.0	0.0	9	0	-9	100%	4.2
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (West)	Foxfield Avenue	21	0	0	22	0	0	0.2	0.0	0.0	21	22	1	5%	0.2
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (West)	Bowsland Way (East)	88	0	4	61	0	4	3.1	0.0	0.0	92	65	-27	29%	3.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Ormonds Close	13	0	0	11	0	0	0.6	0.0	0.0	13	11	-2	15%	0.6
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Ellicks Close	25	0	0	24	0	0	0.2	0.0	0.0	25	24	-1	4%	0.2
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Bowsland Way	49	1	7	89	1	5	4.8	0.0	0.8	57	95	38	67%	4.4
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Trench Lane	1	0	0	0	0	0	1.4	0.0	0.0	1	0	-1	100%	1.4
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Ellicks Close	5	0	0	5	0	0	0.0	0.0	0.0	5	5	0	0%	0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Bowsland Way	69	0	0	48	0	0	2.7	0.0	0.0	69	48	-21	30%	2.7
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Trench Lane	35	0	0	59	0	0	3.5	0.0	0.0	35	59	24	69%	3.5
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Ormonds Close	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Bowsland Way	34	0	0	22	0	0	2.3	0.0	0.0	34	22	-12	35%	2.3
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Trench Lane	38	0	0	54	0	0	2.4	0.0	0.0	38	54	16	42%	2.4
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Ormonds Close	2	0	0	2	0	0	0.0	0.0	0.0	2	2	0	0%	0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Ellicks Close	1	0	0	1	0	0	0.0	0.0	0.0	1	1	0	0%	0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Trench Lane	46	0	4	56	0	4	1.4	0.0	0.0	50	60	10	20%	1.3
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Ormonds Close	12	0	0	7	0	0	1.6	0.0	0.0	12	7	-5	42%	1.6
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Ellicks Close	25	0	0	17	0	0	1.7	0.0	0.0	25	17	-8	32%	1.7
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Bowsland Way	9	0	0	0	0	0	4.2	0.0	0.0	9	0	-9	100%	4.2
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Trench Lane (South)	62	1	0	114	1	0	5.5	0.0	0.0	63	115	52	83%	5.5
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Trench Lane (North)	577	9	1	529	3	0	2.0	2.4	1.4	587	532	-55	9%	2.3
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Trench Lane (East)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Trench Lane (North)	48	0	4	67	0	4	2.5	0.0	0.0	52	71	19	37%	2.4
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Trench Lane (East)	72	0	0	104	0	0	3.4	0.0	0.0	72	104	32	44%	3.4
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Trench Lane (South)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Trench Lane (East)	82	5	0	96	8	0	1.5	1.2	0.0	87	104	17	20%	1.7
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Trench Lane (South)	26	0	7	11	0	5	3.5	0.0	0.8	33	16	-17	52%	3.4
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Trench Lane (North)	2	0	0	0	0	0	2.0	0.0	0.0	2	0	-2	100%	2.0

	122	
	118	
GEH<5	9 6.7%	
<1	51	41.8%
<2	80	65.6%
<3	102	83.6%
<4	113	92.6%
<5	118	96.7%
<6	121	99.2%
<7	121	99.2%
<8	121	99.2%

Junction No.	Junction Description	From Arm	To Arm	17:00-18:00									17:00-18:00				
				Observed			Modelled			GEH			TOTAL VEHICLES SUMMARY				
				Lights	Heavies	Buses	Lights	Heavies	Buses	Lights	Heavies	Buses	Observed	Modelled	Difference	%	GEH
Site 1	M5 East / A38 Gloucester	M5 (East)	A38 Gloucester Road (South)	733	11	2	778	8	0	1.6	1.0	2.0	746	786	40	5%	1.4
Site 1	M5 East / A38 Gloucester	M5 (East)	M5 (West)	6	0	0	0	0	0	3.5	0.0	0.0	6	0	-6	100%	3.5
Site 1	M5 East / A38 Gloucester	M5 (East)	A38 Gloucester Road (North)	297	4	0	292	2	0	0.3	1.2	0.0	301	294	-7	2%	0.4
Site 1	M5 East / A38 Gloucester	M5 (East)	M5 (East)	2	1	0	1	1	0	0.8	0.0	0.0	3	2	-1	33%	0.6
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	M5 (West)	691	3	0	719	7	0	1.1	1.8	0.0	694	726	32	5%	1.2
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	A38 Gloucester Road (North)	519	0	4	530	1	3	0.5	1.4	0.5	523	534	11	2%	0.5
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	M5 (East)	1254	15	2	1350	5	0	2.7	3.2	2.0	1271	1355	84	7%	2.3
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	A38 Gloucester Road (South)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 1	M5 East / A38 Gloucester	M5 (West)	A38 Gloucester Road (North)	543	14	0	562	8	0	0.8	1.8	0.0	557	570	13	2%	0.5
Site 1	M5 East / A38 Gloucester	M5 (West)	M5 (East)	16	1	0	0	0	0	5.7	1.4	0.0	17	0	-17	100%	5.8
Site 1	M5 East / A38 Gloucester	M5 (West)	A38 Gloucester Road (South)	555	5	1	607	7	0	2.2	0.8	1.4	561	614	53	9%	2.2
Site 1	M5 East / A38 Gloucester	M5 (West)	M5 (West)	3	1	0	0	0	0	2.4	1.4	0.0	4	0	-4	100%	2.8
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	M5 (East)	248	4	0	269	3	0	1.3	0.5	0.0	252	272	20	8%	1.2
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	A38 Gloucester Road (South)	423	2	6	399	2	3	1.2	0.0	1.4	431	404	-27	6%	1.3
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	M5 (West)	344	8	0	383	9	0	2.0	0.3	0.0	352	392	40	11%	2.1
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	A38 Gloucester Road (North)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	A38 Gloucester Road (South)	411	1	6	386	0	3	1.3	1.4	1.4	418	389	-29	7%	1.4
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	Park Avenue	56	0	1	52	0	0	0.5	0.0	1.4	57	52	-5	9%	0.7
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	A38 Gloucester Road (North)	845	5	1	803	3	1	1.5	1.0	0.0	851	807	-44	5%	1.5
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	Bradley Stoke Way	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	Park Avenue	37	0	0	42	0	0	0.8	0.0	0.0	37	42	5	14%	0.8
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	A38 Gloucester Road (North)	633	12	4	696	11	2	2.4	0.3	1.2	649	709	60	9%	2.3
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	Bradley Stoke Way	241	1	3	231	0	5	0.7	1.4	1.0	245	236	-9	4%	0.6
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	A38 Gloucester Road (South)	48	0	0	49	0	0	0.1	0.0	0.0	48	49	1	2%	0.1
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	A38 Gloucester Road (North)	985	1	1	1063	0	0	2.4	1.4	1.4	987	1063	76	8%	2.4
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	Bradley Stoke Way	240	1	0	250	0	0	0.6	1.4	0.0	241	250	9	4%	0.6
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	A38 Gloucester Road (South)	268	0	6	272	0	0	0.2	0.0	3.5	274	272	-2	1%	0.1
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	Park Avenue	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	Bradley Stoke Way	879	1	2	912	4	1	1.1	1.9	0.8	882	917	35	4%	1.2
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	A38 Gloucester Road (South)	766	13	3	771	13	2	0.2	0.0	0.6	782	786	4	1%	0.1
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	Park Avenue	69	4	4	83	0	0	1.6	2.8	2.8	77	83	6	8%	0.7
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	A38 Gloucester Road (North)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Bowsland Way	11	0	0	0	0	0	4.7	0.0	0.0	11	0	-11	100%	4.7
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Bradley Stoke Way (East)	92	1	0	67	0	0	2.8	1.4	0.0	93	67	-26	28%	2.9
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Brook Way	99	0	2	68	0	0	3.4	0.0	2.0	101	68	-33	33%	3.6
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Bradley Stoke Way (West)	106	0	0	113	0	0	0.7	0.0	0.0	106	113	7	7%	0.7
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Pear Tree Road	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Bradley Stoke Way (East)	81	0	0	51	0	0	3.7	0.0	0.0	81	51	-30	37%	3.7
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Brook Way	60	0	4	45	0	4	2.1	0.0	0.0	64	49	-15	23%	2.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Bradley Stoke Way (West)	69	0	0	50	0	0	2.5	0.0	0.0	69	50	-19	28%	2.5
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Pear Tree Road	5	0	0	0	0	0	3.2	0.0	0.0	5	0	-5	100%	3.2
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Bowsland Way	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Brook Way	50	0	0	55	0	0	0.7	0.0	0.0	50	55	5	10%	0.7
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Bradley Stoke Way (West)	277	1	2	294	0	0	1.0	1.4	2.0	280	294	14	5%	0.8
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Pear Tree Road	55	0	0	50	0	0	0.7	0.0	0.0	55	50	-5	9%	0.7
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Bowsland Way	75	0	0	57	0	0	2.2	0.0	0.0	75	57	-18	24%	2.2
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Bradley Stoke Way (East)	1	0	0	0	0	0	1.4	0.0	0.0	1	0	-1	100%	1.4
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Bradley Stoke Way (West)	227	1	1	240	0	1	0.9	1.4	0.0	229	241	12	5%	0.8
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Pear Tree Road	90	0	2	76	0	0	1.5	0.0	2.0	92	76	-16	17%	1.7
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Bowsland Way	89	1	4	77	0	4	1.3	1.4	0.0	94	81	-13	14%	1.4
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Bradley Stoke Way (East)	41	0	0	45	0	0	0.6	0.0	0.0	41	45	4	10%	0.6
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Brook Way	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Pear Tree Road	57	0	0	39	1	1	2.6	1.4	1.4	57	41	-16	28%	2.3
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Bowsland Way	99	0	0	82	0	0	1.8	0.0	0.0	99	82	-17	17%	1.8
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Bradley Stoke Way (East)	476	0	0	546	2	0	3.1	2.0	0.0	476	548	72	15%	3.2
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Brook Way	300	0	1	332	0	1	1.8	0.0	0.0	301	333	32	11%	1.8
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Bradley Stoke Way (West)	1	0	0	0	0	0	1.4	0.0	0.0	1	0	-1	100%	1.4
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (East)	Hortham Lane	54	0	0	59	0	0	0.7	0.0	0.0	54	59	5	9%	0.7
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (East)	A38 Gloucester Road (West)	818	14	5	855	15	3	1.3	0.3	1.0	837	873	36	4%	1.2
Site 4	A38 Gloucester Road / Hortham Lane	Hortham Lane	A38 Gloucester Road (West)	100	0	1	95	0	0	0.5	0.0	1.4	101	95	-6	6%	0.6
Site 4	A38 Gloucester Road / Hortham Lane	Hortham Lane	A38 Gloucester Road (East)	37	0	1	38	0	0	0.2	0.0	1.4	38	38	0	0%	0.0
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (West)	A38 Gloucester Road (East)	1109	18	3	1135	11	4	0.8	1.8	0.5	1130	1150	20	2%	0.6
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (West)	Hortham Lane	156	0	1	170	0	0	1.1	0.0	1.4	157	170	13	8%	1.0
Site 5	Bradley Stoke Way / Woodlands Lane	Woodlands Lane	Bradley Stoke Way (East)	33	0	0	55	0	0	3.3	0.0	0.0	33	55	22	67%	3.3
Site 5	Bradley Stoke Way / Woodlands Lane	Woodlands Lane	Bradley Stoke Way (West)	644	4	5	548	1	3	3.9	1.9	1.0	653	552	-101	15%	4.1
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (East)	Bradley Stoke Way (West)	668	2	3	688	1	1	0.8	0.8	1.4	673	690	17	3%	0.7
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (East)	Woodlands Lane	15	0	0	12	0	0	0.8	0.0	0.0	15	12	-3	20%	0.8
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (West)	Woodlands Lane	460	3	4	462	1	4	0.1	1.4	0.0	467	467	0	0%	0.0
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (West)	Bradley Stoke Way (East)	900	0	1	936	3	2	1.2	2.4	0.8	901	941	40	4%	1.3
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Pear Tree Road	94	1	0	74	0	0	2.2	1.4	0.0	95	74	-21	22%	2.3
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Woodlands Lane (West)	203	3	5	203	0	4	0.0	2.4	0.5	211	207	-4	2%	0.3
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Great Park Road	4	0	0	0	0	0	2.8	0.0	0.0	4	0	-4	100%	2.8
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Woodlands Lane (East)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Woodlands Lane (West)	27	0	0	6	1	0	5.2	1.4	0.0	27	7	-20	74%	4.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Great Park Road	15	0	2	12	0	0	0.8	0.0	2.0	17	12	-5	29%	1.3
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Woodlands Lane (East)	71	0	0	59	0	1	1.5	0.0	1.4	71	60	-11	15%	1.4
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Pear Tree Road	2	0	0	0	0	0	2.0	0.0	0.0	2	0	-2	100%	2.0
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Great Park Road	33	0	0	33	0	0	0.0	0.0	0.0	33	33	0	0%	0.0
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Woodlands Lane (East)	347	3	4	338	0	4	0.5	2.4	0.0	354	342	-12	3%	0.6
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Pear Tree Road	75	0	0	69	0	0	0.7	0.0	0.0	75	69	-6	8%	0.7
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Woodlands Lane (West)	2	0	0	0	0	0	2.0	0.0	0.0	2	0	-2	100%	2.0
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Woodlands Lane (East)	116	0	0	123	0	0	0.6	0.0	0.0	116	123	7	6%	0.6
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Pear Tree Road	131	0	2	141	0	0	0.9	0.0	2.0	133	141	8	6%	0.7
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Woodlands Lane (West)	254	0	0	198	0	0	3.7	0.0	0.0	254	198	-56	22%	3.7
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Great Park Road	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane East	Foxfield Avenue	11	0	0	0	0	0	4.7	0.0	0.0	11	0	-11	100%	4.7
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane East	Woodlands Lane West	140	3	5	120	4	4	1.8	0.5	0.5	148	128	-20	14%	1.7
Site 7	Woodlands Lane / Foxfield Avenue	Foxfield Avenue	Woodlands Lane West	6	0	0	10	0	0	1.4	0.0	0.0	6	10	4	67%	1.4
Site 7	Woodlands Lane / Foxfield Avenue	Foxfield Avenue	Woodlands Lane East	1	0	0	11	0	0	4.1	0.0	0.0	1	11	10	1000%	4.1
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane West	Woodlands Lane East	621	4	4	581	4	5	1.6	0.0	0.5	629	590	-39	6%	1.6
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane West	Foxfield Avenue	40	0	0	32	0	0	1.3	0.0	0.0	40	32	-8	20%	1.3
Site 8	Foxfield Avenue / Bowsland Way	Foxfield Avenue	Bowsland Way (East)	8	0	0	3	0	0	2.1	0.0	0.0	8	3	-5	63%	2.1
Site 8	Foxfield Avenue / Bowsland Way	Foxfield Avenue	Bowsland Way (West)	33	0	0	14	0	0	3.9	0.0	0.0	33	14	-19	58%	3.9
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (East)	Bowsland Way (West)	172	0	4	129	1	4	3.5	1.4	0.0	176	134	-42	24%	3.4
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (East)	Foxfield Avenue	6	0	0	0	0	0	3.5	0.0	0.0	6	0	-6	100%	3.5
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (West)	Foxfield Avenue	26	0	0	23	0	0	0.6	0.0	0.0	26	23	-3	12%	0.6
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (West)	Bowsland Way (East)	237	1	5	192	0	4	3.1	1.4	0.5	243	196	-47	19%	3.2
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Ormonds Close	44	0	0	70	0	0	3.4	0.0	0.0	44	70	26	59%	3.4
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Ellicks Close	42	0	0	50	0	0	1.2	0.0	0.0	42	50	8	19%	1.2
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Bowsland Way	63	0	4	60	1	4	0.4	1.4	0.0	67	65	-2	3%	0.2
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Trench Lane	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Ellicks Close	3	0	0	3	0	0	0.0	0.0	0.0	3	3	0	0%	0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Bowsland Way	32	0	0	24	0	0	1.5	0.0	0.0	32	24	-8	25%	1.5
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Trench Lane	15	0	0	29	0	0	3.0	0.0	0.0	15	29	14	93%	3.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Ormonds Close	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Bowsland Way	34	0	0	23	0	0	2.1	0.0	0.0	34	23	-11	32%	2.1
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Trench Lane	17	0	0	37	0	0	3.8	0.0	0.0	17	37	20	118%	3.8
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Ormonds Close	1	0	0	1	0	0	0.0	0.0	0.0	1	1	0	0%	0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Ellicks Close	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Trench Lane	48	0	5	15	0	4	5.9	0.0	0.5	53	19	-34	64%	5.7
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Ormonds Close	51	0	0	40	0	0	1.6	0.0	0.0	51	40	-11	22%	1.6
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Ellicks Close	26	0	0	23	0	0	0.6	0.0	0.0	26	23	-3	12%	0.6
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Bowsland Way	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Trench Lane (South)	89	0	0	73	0	0	1.8	0.0	0.0	89	73	-16	18%	1.8
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Trench Lane (North)	89	3	0	77	4	0	1.3	0.5	0.0	92	81	-11	12%	1.2
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Trench Lane (East)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Trench Lane (North)	20	0	5	14	0	4	1.5	0.0	0.5	25	18	-7	28%	1.5
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Trench Lane (East)	60	0	0	67	0	0	0.9	0.0	0.0	60	67	7	12%	0.9
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Trench Lane (South)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Trench Lane (East)	510	4	0	463	4	0	2.1	0.0	0.0	514	467	-47	9%	2.1
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Trench Lane (South)	60	0	4	109	0	5	5.3	0.0	0.5	64	114	50	78%	5.3
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Trench Lane (North)	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0		0.0

	122		
	119		
GEH<5	9 7.5%		
<1	55	45.1%	
<2	85	69.7%	
<3	101	82.8%	
<4	114	93.4%	
<5	119	97.5%	
<6	122	100.0%	
<7	122	100.0%	
<8	122	100.0%	

Junction No.	Junction Description	From Arm	Approach / Exit	08:00-09 :00									08:00-09 :00				
				Observed			Modelled			GEH			TOTAL VEHICLES SUMMARY				
				Lights	Heavies	Buses	Lights	Heavies	Buses	Lights	Heavies	Buses	Observed	Modelled	Difference	%	GEH
Site 1	M5 East / A38 Gloucester	M5 (East)	Approach	2031	43	3	1963	41	0	1.5	0.3	2.4	2077	2004	-73	4%	1.6
Site 1	M5 East / A38 Gloucester	M5 (East)	Exit	652	33	4	645	29	0	0.3	0.7	2.8	689	674	-15	2%	0.6
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	Approach	1130	36	21	1185	32	16	1.6	0.7	1.2	1187	1233	46	4%	1.3
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	Exit	3175	47	14	3020	66	11	2.8	2.5	0.8	3236	3097	-139	4%	2.5
Site 1	M5 East / A38 Gloucester	M5 (West)	Approach	1165	26	0	1093	29	0	2.1	0.6	0.0	1191	1122	-69	6%	2.0
Site 1	M5 East / A38 Gloucester	M5 (West)	Exit	674	36	3	672	33	0	0.1	0.5	2.4	713	705	-8	1%	0.3
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	Approach	1079	41	11	1010	50	11	2.1	1.3	0.0	1131	1071	-60	5%	1.8
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	Exit	904	30	14	914	24	16	0.3	1.2	0.5	948	954	6	1%	0.2
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	Approach	1124	18	14	1142	6	9	0.5	3.5	1.5	1156	1157	1	0%	0.0
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	Exit	1289	17	12	1262	23	6	0.8	1.3	2.0	1318	1291	-27	2%	0.7
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	Approach	1164	21	21	1125	21	15	1.2	0.0	1.4	1206	1161	-45	4%	1.3
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	Exit	1240	35	15	1141	34	12	2.9	0.2	0.8	1290	1187	-103	8%	2.9
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	Approach	218	7	8	208	8	0	0.7	0.4	4.0	233	216	-17	7%	1.1
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	Exit	2027	5	9	1877	8	0	3.4	1.2	4.2	2041	1885	-156	8%	3.5
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	Approach	3177	47	14	2986	62	10	3.4	2.0	1.2	3238	3058	-180	6%	3.2
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	Exit	1127	36	21	1181	32	16	1.6	0.7	1.2	1184	1229	45	4%	1.3
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Approach	194	2	2	251	0	0	3.8	2.0	2.0	198	251	53	27%	3.5
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Exit	244	0	1	201	0	1	2.9	0.0	0.0	245	202	-43	18%	2.9
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Approach	306	1	7	262	1	4	2.6	0.0	1.3	314	267	-47	15%	2.8
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Exit	92	0	4	80	0	4	1.3	0.0	0.0	96	84	-12	13%	1.3
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Approach	338	6	2	315	3	0	1.3	1.4	2.0	346	318	-28	8%	1.5
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Exit	394	5	2	400	1	0	0.3	2.3	2.0	401	401	0	0%	0.0
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Approach	451	2	10	430	0	10	1.0	2.0	0.0	463	440	-23	5%	1.1
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Exit	254	3	9	248	0	5	0.4	2.4	1.5	266	253	-13	5%	0.8
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Approach	404	7	4	349	1	2	2.8	3.0	1.2	415	352	-63	15%	3.2
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Exit	709	10	9	678	4	6	1.2	2.3	1.1	728	688	-40	5%	1.5
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (East)	Approach	855	40	11	856	53	11	0.0	1.9	0.0	906	920	14	2%	0.5
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (East)	Exit	893	27	15	913	23	17	0.7	0.8	0.5	935	953	18	2%	0.6
Site 4	A38 Gloucester Road / Hortham Lane	Hortham Lane	Approach	288	1	3	279	0	0	0.5	1.4	2.4	292	279	-13	4%	0.8
Site 4	A38 Gloucester Road / Hortham Lane	Hortham Lane	Exit	107	3	2	111	0	0	0.4	2.4	2.0	112	111	-1	1%	0.1
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (West)	Approach	880	30	14	896	23	17	0.5	1.4	0.8	924	936	12	1%	0.4
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (West)	Exit	1023	41	11	1007	53	11	0.5	1.8	0.0	1075	1071	-4	0%	0.1
Site 5	Bradley Stoke Way / Woodlands Lane	Woodlands Lane	Approach	403	9	5	436	3	3	1.6	2.4	1.0	417	442	25	6%	1.2
Site 5	Bradley Stoke Way / Woodlands Lane	Woodlands Lane	Exit	932	11	8	946	23	4	0.5	2.9	1.6	951	973	22	2%	0.7
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (East)	Approach	759	10	9	767	5	6	0.3	1.8	1.1	778	778	0	0%	0.0
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (East)	Exit	395	7	4	392	1	2	0.2	3.0	1.2	406	395	-11	3%	0.5
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (West)	Approach	1289	17	12	1268	23	6	0.6	1.3	2.0	1318	1297	-21	2%	0.6
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (West)	Exit	1124	18	14	1133	7	9	0.3	3.1	1.5	1156	1149	-7	1%	0.2
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Approach	526	8	5	560	2	4	1.5	2.7	0.5	539	566	27	5%	1.1
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Exit	411	7	7	366	15	5	2.3	2.4	0.8	425	386	-39	9%	1.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Approach	223	0	1	211	1	1	0.8	1.4	0.0	224	213	-11	5%	0.7
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Exit	119	2	2	103	1	0	1.5	0.8	2.0	123	104	-19	15%	1.8
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Approach	749	10	8	745	16	4	0.1	1.7	1.6	767	765	-2	0%	0.1
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Exit	363	9	5	408	3	4	2.3	2.4	0.5	377	415	38	10%	1.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Approach	62	1	1	80	0	0	2.1	1.4	1.4	64	80	16	25%	1.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Exit	667	1	1	719	0	0	2.0	1.4	1.4	669	719	50	7%	1.9
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane East	Approach	666	9	5	643	2	4	0.9	3.0	0.5	680	649	-31	5%	1.2
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane East	Exit	167	5	7	152	9	5	1.2	1.5	0.8	179	166	-13	7%	1.0
Site 7	Woodlands Lane / Foxfield Avenue	Foxfield Avenue	Approach	40	0	0	57	0	0	2.4	0.0	0.0	40	57	17	43%	2.4
Site 7	Woodlands Lane / Foxfield Avenue	Foxfield Avenue	Exit	8	0	0	8	0	0	0.0	0.0	0.0	8	8	0	0%	0.0
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane West	Approach	165	5	7	146	9	5	1.5	1.5	0.8	177	160	-17	10%	1.3
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane West	Exit	696	9	5	686	2	4	0.4	3.0	0.5	710	692	-18	3%	0.7
Site 8	Foxfield Avenue / Bowsland Way	Foxfield Avenue	Approach	26	0	0	23	0	0	0.6	0.0	0.0	26	23	-3	12%	0.6
Site 8	Foxfield Avenue / Bowsland Way	Foxfield Avenue	Exit	30	0	0	22	0	0	1.6	0.0	0.0	30	22	-8	27%	1.6
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (East)	Approach	262	1	7	243	1	4	1.2	0.0	1.3	270	248	-22	8%	1.4
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (East)	Exit	97	0	4	67	0	4	3.3	0.0	0.0	101	71	-30	30%	3.2
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (West)	Approach	109	0	4	83	0	4	2.7	0.0	0.0	113	87	-26	23%	2.6
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (West)	Exit	270	1	7	260	1	4	0.6	0.0	1.3	278	265	-13	5%	0.8
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Approach	88	1	7	124	1	5	3.5	0.0	0.8	96	130	34	35%	3.2
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Exit	120	0	4	169	0	4	4.1	0.0	0.0	124	173	49	40%	4.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Approach	109	0	0	112	0	0	0.3	0.0	0.0	109	112	3	3%	0.3
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Exit	27	0	0	20	0	0	1.4	0.0	0.0	27	20	-7	26%	1.4
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Approach	75	0	0	79	0	0	0.5	0.0	0.0	75	79	4	5%	0.5
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Exit	56	0	0	47	0	0	1.3	0.0	0.0	56	47	-9	16%	1.3
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Approach	92	0	4	80	0	4	1.3	0.0	0.0	96	84	-12	13%	1.3
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Exit	161	1	7	159	1	5	0.2	0.0	0.8	169	165	-4	2%	0.3
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Approach	639	10	1	643	4	0	0.2	2.3	1.4	650	647	-3	0%	0.1
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Exit	154	5	0	200	8	0	3.5	1.2	0.0	159	208	49	31%	3.6
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Approach	120	0	4	171	0	4	4.2	0.0	0.0	124	175	51	41%	4.2
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Exit	88	1	7	125	1	5	3.6	0.0	0.8	96	131	35	36%	3.3
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Approach	110	5	7	107	8	5	0.3	1.2	0.8	122	120	-2	2%	0.2
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Exit	627	9	5	596	3	4	1.3	2.4	0.5	641	603	-38	6%	1.5

	72	
	72	
GEH<5	**100.0%**	
<1	30	41.7%
<2	56	77.8%
<3	62	86.1%
<4	71	98.6%
<5	72	100.0%
<6	72	100.0%
<7	72	100.0%
<8	72	100.0%
<700vehs	within 100	
pass	47	100.0%
fail	0	0.0%
700-2700	<15%	
pass	23	100.0%
fail	0	0.0%
>2700vehs	within 400	
pass	2	100.0%
fail	0	0.0%

Junction No.	Junction Description	From Arm	Approach / Exit	17:00-18:00									17:00-18:00				
				Observed			Modelled			GEH			TOTAL VEHICLES SUMMARY				
				Lights	Heavies	Buses	Lights	Heavies	Buses	Lights	Heavies	Buses	Observed	Modelled	Difference	%	GEH
Site 1	M5 East / A38 Gloucester	M5 (East)	Approach	1038	16	2	1071	11	0	1.0	1.4	2.0	1056	1082	26	2%	0.8
Site 1	M5 East / A38 Gloucester	M5 (East)	Exit	1520	21	2	1620	9	0	2.5	3.1	2.0	1543	1629	86	6%	2.2
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	Approach	2464	18	6	2599	13	3	2.7	1.3	1.4	2488	2615	127	5%	2.5
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (South)	Exit	1711	18	9	1784	17	3	1.7	0.2	2.4	1738	1804	66	4%	1.6
Site 1	M5 East / A38 Gloucester	M5 (West)	Approach	1117	21	1	1169	15	0	1.5	1.4	1.4	1139	1184	45	4%	1.3
Site 1	M5 East / A38 Gloucester	M5 (West)	Exit	1044	12	0	1102	16	0	1.8	1.1	0.0	1056	1118	62	6%	1.9
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	Approach	1015	14	6	1051	14	3	1.1	0.0	1.4	1035	1068	33	3%	1.0
Site 1	M5 East / A38 Gloucester	A38 Gloucester Road (North)	Exit	1359	18	4	1384	11	3	0.7	1.8	0.5	1381	1398	17	1%	0.5
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	Approach	1312	6	8	1241	3	4	2.0	1.4	1.6	1326	1248	-78	6%	2.2
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Bradley Stoke Way	Exit	1360	3	5	1393	4	6	0.9	0.5	0.4	1368	1403	35	3%	0.9
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	Approach	959	13	7	1018	11	7	1.9	0.6	0.0	979	1036	57	6%	1.8
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (South)	Exit	1493	14	15	1478	13	5	0.4	0.3	3.2	1522	1496	-26	2%	0.7
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	Approach	1493	2	7	1585	0	0	2.3	2.0	3.7	1502	1585	83	6%	2.1
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	Park Avenue	Exit	162	4	5	177	0	0	1.2	2.8	3.2	171	177	6	4%	0.5
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	Approach	1714	18	9	1766	17	3	1.2	0.2	2.4	1741	1786	45	3%	1.1
Site 2	A38 Gloucester Road / Bradley Stoke Way / Park Avenue	A38 Gloucester Road (North)	Exit	2463	18	6	2562	14	3	2.0	1.0	1.4	2487	2579	92	4%	1.8
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Approach	308	1	2	248	0	0	3.6	1.4	2.0	311	248	-63	20%	3.8
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Pear Tree Road	Exit	207	0	2	165	1	1	3.1	1.4	0.8	209	167	-42	20%	3.1
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Approach	215	0	4	146	0	4	5.1	0.0	0.0	219	150	-69	32%	5.1
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bowsland Way	Exit	274	1	4	216	0	4	3.7	1.4	0.0	279	220	-59	21%	3.7
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Approach	458	1	2	456	0	0	0.1	1.4	2.0	461	456	-5	1%	0.2
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (East)	Exit	691	1	0	709	2	0	0.7	0.8	0.0	692	711	19	3%	0.7
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Approach	447	2	7	438	0	5	0.4	2.0	0.8	456	443	-13	3%	0.6
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Brook Way	Exit	509	0	7	500	0	5	0.4	0.0	0.8	516	505	-11	2%	0.5
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Approach	933	0	1	999	3	2	2.1	2.4	0.8	934	1004	70	7%	2.2
Site 3	Bradley Stoke Way / Pear Tree Road / Bowsland Way / Brook Way	Bradley Stoke Way (West)	Exit	680	2	3	697	0	1	0.6	2.0	1.4	685	698	13	2%	0.5
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (East)	Approach	872	14	5	914	15	3	1.4	0.3	1.0	891	932	41	5%	1.4
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (East)	Exit	1146	18	4	1173	11	4	0.8	1.8	0.0	1168	1188	20	2%	0.6
Site 4	A38 Gloucester Road / Hortham Lane	Hortham Lane	Approach	137	0	2	133	0	0	0.3	0.0	2.0	139	133	-6	4%	0.5
Site 4	A38 Gloucester Road / Hortham Lane	Hortham Lane	Exit	210	0	1	229	0	0	1.3	0.0	1.4	211	229	18	9%	1.2
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (West)	Approach	1265	18	4	1305	11	4	1.1	1.8	0.0	1287	1320	33	3%	0.9
Site 4	A38 Gloucester Road / Hortham Lane	A38 Gloucester Road (West)	Exit	918	14	6	950	15	3	1.0	0.3	1.4	938	968	30	3%	1.0
Site 5	Bradley Stoke Way / Woodlands Lane	Woodlands Lane	Approach	677	4	5	603	1	3	2.9	1.9	1.0	686	607	-79	12%	3.1
Site 5	Bradley Stoke Way / Woodlands Lane	Woodlands Lane	Exit	475	3	4	474	1	4	0.0	1.4	0.0	482	479	-3	1%	0.1
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (East)	Approach	683	2	3	700	1	1	0.6	0.8	1.4	688	702	14	2%	0.5
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (East)	Exit	933	0	1	991	3	2	1.9	2.4	0.8	934	996	62	7%	2.0
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (West)	Approach	1360	3	5	1398	4	6	1.0	0.5	0.4	1368	1408	40	3%	1.1
Site 5	Bradley Stoke Way / Woodlands Lane	Bradley Stoke Way (West)	Exit	1312	6	8	1236	2	4	2.1	2.0	1.6	1326	1242	-84	6%	2.3
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Approach	301	4	5	277	0	4	1.4	2.8	0.5	310	281	-29	9%	1.7
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (East)	Exit	534	3	4	520	0	5	0.6	2.4	0.5	541	525	-16	3%	0.7
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Approach	115	0	2	77	1	1	3.9	1.4	0.8	117	79	-38	32%	3.8
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Pear Tree Road	Exit	302	1	2	284	0	0	1.1	1.4	2.0	305	284	-21	7%	1.2
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Approach	457	3	4	440	0	4	0.8	2.4	0.0	464	444	-20	4%	0.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Woodlands Lane (West)	Exit	486	3	5	407	1	4	3.7	1.4	0.5	494	412	-82	17%	3.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Approach	501	0	2	462	0	0	1.8	0.0	2.0	503	462	-41	8%	1.9
Site 6	Woodlands Lane / Great Park Road / Pear Tree Road	Great Park Road	Exit	52	0	2	45	0	0	1.0	0.0	2.0	54	45	-9	17%	1.3
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane East	Approach	151	3	5	120	4	4	2.7	0.5	0.5	159	128	-31	19%	2.6
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane East	Exit	622	4	4	592	4	5	1.2	0.0	0.5	630	601	-29	5%	1.2
Site 7	Woodlands Lane / Foxfield Avenue	Foxfield Avenue	Approach	7	0	0	21	0	0	3.7	0.0	0.0	7	21	14	200%	3.7
Site 7	Woodlands Lane / Foxfield Avenue	Foxfield Avenue	Exit	51	0	0	32	0	0	2.9	0.0	0.0	51	32	-19	37%	2.9
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane West	Approach	661	4	4	613	4	5	1.9	0.0	0.5	669	622	-47	7%	1.8
Site 7	Woodlands Lane / Foxfield Avenue	Woodlands Lane West	Exit	146	3	5	130	4	4	1.4	0.5	0.5	154	138	-16	10%	1.3
Site 8	Foxfield Avenue / Bowsland Way	Foxfield Avenue	Approach	41	0	0	17	0	0	4.5	0.0	0.0	41	17	-24	59%	4.5
Site 8	Foxfield Avenue / Bowsland Way	Foxfield Avenue	Exit	32	0	0	23	0	0	1.7	0.0	0.0	32	23	-9	28%	1.7
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (East)	Approach	178	0	4	129	1	4	4.0	1.4	0.0	182	134	-48	26%	3.8
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (East)	Exit	245	1	5	195	0	4	3.4	1.4	0.5	251	199	-52	21%	3.5
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (West)	Approach	263	1	5	215	0	4	3.1	1.4	0.5	269	219	-50	19%	3.2
Site 8	Foxfield Avenue / Bowsland Way	Bowsland Way (West)	Exit	205	0	4	143	1	4	4.7	1.4	0.0	209	148	-61	29%	4.6
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Approach	149	0	4	180	1	4	2.4	1.4	0.0	153	185	32	21%	2.5
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Trench Lane	Exit	80	0	5	81	0	4	0.1	0.0	0.5	85	85	0	0%	0.0
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Approach	50	0	0	56	0	0	0.8	0.0	0.0	50	56	6	12%	0.8
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ormonds Close	Exit	96	0	0	111	0	0	1.5	0.0	0.0	96	111	15	16%	1.5
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Approach	52	0	0	61	0	0	1.2	0.0	0.0	52	61	9	17%	1.2
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Ellicks Close	Exit	71	0	0	76	0	0	0.6	0.0	0.0	71	76	5	7%	0.6
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Approach	125	0	5	78	0	4	4.7	0.0	0.5	130	82	-48	37%	4.7
Site 9	Trench Lane / Ormonds Close / Ellicks Close / Bowsland Way	Bowsland Way	Exit	129	0	4	107	1	4	2.0	1.4	0.0	133	112	-21	16%	1.9
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Approach	178	3	0	150	4	0	2.2	0.5	0.0	181	154	-27	15%	2.1
Site 10	Woodlands Lane / Trench Lane	Trench Lane (East)	Exit	570	4	0	530	4	0	1.7	0.0	0.0	574	534	-40	7%	1.7
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Approach	80	0	5	81	0	4	0.1	0.0	0.5	85	85	0	0%	0.0
Site 10	Woodlands Lane / Trench Lane	Trench Lane (South)	Exit	149	0	4	182	0	5	2.6	0.0	0.5	153	187	34	22%	2.6
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Approach	570	4	4	572	4	5	0.1	0.0	0.5	578	581	3	1%	0.1
Site 10	Woodlands Lane / Trench Lane	Trench Lane (North)	Exit	109	3	5	91	4	4	1.8	0.5	0.5	117	99	-18	15%	1.7

	72	
	71	
GEH<5	**98.6%**	
<1	24	33.3%
<2	47	65.3%
<3	58	80.6%
<4	68	94.4%
<5	71	98.6%
<6	72	100.0%
<7	72	100.0%
<8	72	100.0%
<700vehs	within 100	
pass	49	100.0%
fail	0	0.0%
700-2700	<15%	
pass	23	100.0%
fail	0	0.0%
>2700vehs	within 400	
pass	0	-
fail	0	-

		08:00-09:00				
		Observed	Modelled	Difference	%	GEH
Site 1 NB	A38 Gloucester Road NB	906	951	46	5%	1.5
Site 1 SB	A38 Gloucester Road SB	912	919	8	1%	0.2
Site 2 EB	Hortham Lane EB	56	33	-23	41%	3.5
Site 2 WB	Hortham Lane WB	126	81	-45	36%	4.4
Site 3 EB	Trench Lane EB	166	207	41	25%	3.0
Site 3 WB	Trench Lane WB	635	646	11	2%	0.4
Site 4 EB	Bowsland Way EB	125	77	-48	38%	4.8
Site 4 WB	Bowsland Way WB	199	205	6	3%	0.4
Site 5 EB	Bradley Stoke Way EB	422	404	-18	4%	0.9
Site 5 WB	Bradley Stoke Way WB	390	321	-69	18%	3.6
Site 6 NB	Brook Way NB	435	441	6	1%	0.3
Site 6 SB	Brook Way SB	275	251	-24	9%	1.5

	12		
	12		
GEH<5	100.0%		
<3	8	66.7%	
<4	10	83.3%	
<5	12	100.0%	
<6	12	100.0%	
<7	12	100.0%	
<8	12	100.0%	
<9	12	100.0%	
<10	12	100.0%	
<700vehs	within 100		
pass	10	100.0%	
fail	0	0.0%	
700-2700	<15%		
pass	2	100.0%	
fail	0	0.0%	
>2700vehs	within 400		
pass	0	-	
fail	0	-	

17:00-18:00				
Observed	Modelled	Difference	%	GEH
1159	1187	28	2%	0.8
886	930	44	5%	1.5
114	75	-39	34%	4.0
66	42	-24	36%	3.2
543	534	-9	2%	0.4
205	152	-53	26%	3.9
158	136	-22	14%	1.8
142	116	-26	18%	2.3
708	708	0	0%	0.0
497	452	-45	9%	2.1
439	441	2	0%	0.1
450	503	53	12%	2.4

	12	
	12	
GEH<5	100.0%	
<3	9	75.0%
<4	12	100.0%
<5	12	100.0%
<6	12	100.0%
<7	12	100.0%
<8	12	100.0%
<9	12	100.0%
<10	12	100.0%
<700vehs	within 100	
pass	9	100.0%
fail	0	0.0%
700-2700	<15%	
pass	3	100.0%
fail	0	0.0%
>2700vehs	within 400	
pass	0	-
fail	0	-

Route	Observed	Modelled	08:00-09 :00		
	08:00-09 :00	08:00-09 :00	Diff (s)	Diff (%)	Pass or Fail
R1 NB 1	25	24	1	-3%	PASS
R1 NB 2	17	13	4	-22%	PASS
R1 NB 3	14	14	0	-2%	PASS
R1 NB 4	23	27	4	19%	PASS
R1 NB 5	65	70	5	8%	PASS
R1 NB 6	14	30	16	113%	PASS
R1 NB 7	11	8	3	-28%	PASS
R1 NB 8	78	71	7	-9%	PASS
R1 NB 9	37	17	20	-53%	PASS
R1 NB 10	113	108	5	-5%	PASS
R1 NB 11	44	58	15	34%	PASS
R1 NB 12	46	57	11	23%	PASS
R1 NB Total	***485***	***496***	***11***	***2%***	***PASS***
R1 SB 1	71	54	17	-24%	PASS
R1 SB 2	62	57	5	-8%	PASS
R1 SB 3	149	203	54	36%	PASS
R1 SB 4	32	48	16	50%	PASS
R1 SB 5	41	77	36	88%	PASS
R1 SB 6	63	19	43	-69%	PASS
R1 SB 7	21	27	7	33%	PASS
R1 SB 8	18	16	2	-11%	PASS
R1 SB 9	4	5	1	30%	PASS
R1 SB 10	35	28	7	-20%	PASS
R1 SB Total	***494***	***534***	***39***	***8%***	***PASS***
R2 EB 1	31	78	47	150%	PASS
R2 EB 2	35	37	3	8%	PASS
R2 EB 3	23	7	16	-68%	PASS
R2 EB 4	26	38	11	43%	PASS
R2 EB 5	27	29	2	8%	PASS
R2 EB 6	33	42	9	26%	PASS
R2 EB 7	26	30	5	19%	PASS
R2 EB 8	88	97	9	10%	PASS
R2 EB 9	64	50	14	-22%	PASS
R2 EB Total	***354***	***409***	***55***	***15%***	***PASS***
R2 WB 1	64	50	13	-21%	PASS
R2 WB 2	88	113	25	28%	PASS
R2 WB 3	25	28	2	8%	PASS
R2 WB 4	53	70	17	32%	PASS
R2 WB 5	117	72	45	-39%	PASS
R2 WB 6	15	10	5	-37%	PASS
R2 WB 7	34	36	2	6%	PASS
R2 WB Total	***396***	***377***	***19***	***-5%***	***PASS***

Route	Observed	Modelled	17:00-18:00		
	17:00-18:00	17:00-18:00	Diff (s)	Diff (%)	Pass or Fail
R1 NB 1	21	30	9	43%	PASS
R1 NB 2	13	15	2	18%	PASS
R1 NB 3	11	13	2	16%	PASS
R1 NB 4	20	24	4	23%	PASS
R1 NB 5	73	40	33	-45%	PASS
R1 NB 6	13	7	6	-46%	PASS
R1 NB 7	7	28	20	270%	PASS
R1 NB 8	55	58	3	5%	PASS
R1 NB 9	11	14	3	30%	PASS
R1 NB 10	102	122	19	19%	PASS
R1 NB 11	53	66	13	24%	PASS
R1 NB 12	42	57	15	35%	PASS
R1 NB Total	***421***	***473***	***52***	***12%***	***PASS***
R1 SB 1	52	53	2	3%	PASS
R1 SB 2	46	56	10	21%	PASS
R1 SB 3	132	147	15	11%	PASS
R1 SB 4	10	18	8	76%	PASS
R1 SB 5	108	56	53	-49%	PASS
R1 SB 6	44	27	17	-38%	PASS
R1 SB 7	20	24	5	24%	PASS
R1 SB 8	15	21	6	39%	PASS
R1 SB 9	4	7	3	66%	PASS
R1 SB 10	28	29	1	5%	PASS
R1 SB Total	***458***	***437***	***21***	***-5%***	***PASS***
R2 EB 1	48	38	10	-22%	PASS
R2 EB 2	18	33	15	87%	PASS
R2 EB 3	11	7	3	-31%	PASS
R2 EB 4	29	32	3	10%	PASS
R2 EB 5	27	34	7	27%	PASS
R2 EB 6	36	38	2	6%	PASS
R2 EB 7	25	23	1	-5%	PASS
R2 EB 8	102	111	9	9%	PASS
R2 EB 9	69	54	16	-23%	PASS
R2 EB Total	***364***	***371***	***6***	***2%***	***PASS***
R2 WB 1	62	46	16	-26%	PASS
R2 WB 2	87	94	7	8%	PASS
R2 WB 3	51	29	22	-44%	PASS
R2 WB 4	135	137	2	1%	PASS
R2 WB 5	75	51	24	-33%	PASS
R2 WB 6	15	10	6	-38%	PASS
R2 WB 7	45	37	9	-19%	PASS
R2 WB Total	***471***	***402***	***69***	***-15%***	***PASS***

Route		AM Base	Run A AM All Sites + TEMPRO	Run B AM All Sites + TEMPRO + Dev	Run C AM All Sites	Run D AM All Sites + Dev	Run E AM All Sites + Capped TEMPRO	Run F AM All Sites + Capped TEMPRO + Dev	
R1 NB 1	1	24	24	24	23	23	24	24	0
R1 NB 2	2	13	13	13	12	12	13	13	0
R1 NB 3	3	14	14	14	14	14	14	14	0
R1 NB 4	4	27	59	56	33	37	46	39	-9
R1 NB 5	5	70	134	134	92	130	123	79	-45
R1 NB 6	6	30	29	28	28	25	28	26	-2
R1 NB 7	7	8	8	8	8	7	8	8	0
R1 NB 8	8	71	59	59	59	59	60	59	-1
R1 NB 9	9	17	19	19	19	19	18	18	0
R1 NB 10	10	108	116	115	115	113	117	115	-2
R1 NB 11	11	56	59	63	59	63	60	62	2
R1 NB 12	12	57	58	58	58	58	58	59	1
AM R1 NB		**499**	**582**	**579**	**518**	**537**	**589**	**515**	-54
R1 SB 1	13	91	97	105	77	91	86	108	20
R1 SB 2	14	57	91	72	67	70	78	75	-4
R1 SB 3	15	333	210	215	130	137	174	242	32
R1 SB 4	16	46	35	27	14	14	37	33	0
R1 SB 5	17	77	86	85	39	38	86	85	-1
R1 SB 6	18	19	21	24	21	21	21	21	0
R1 SB 7	19	27	28	28	28	27	28	27	0
R1 SB 8	20	16	16	16	16	16	16	16	0
R1 SB 9	21	5	4	4	4	4	4	4	0
R1 SB 10	22	28	31	31	29	29	31	29	-3
AM R1 SB		**594**	**681**	**585**	**490**	**448**	**618**	**596**	-21
R2 DB 1	23	76	168	162	179	193	168	174	6
R2 DB 2	24	37	46	46	45	46	46	46	0
R2 DB 3	25	7	7	7	7	7	7	7	0
R2 DB 4	26	96	96	96	96	96	96	96	0
R2 DB 5	27	29	31	31	29	30	30	29	0
R2 DB 6	28	42	50	51	44	47	47	46	-1
R2 DB 7	29	30	42	44	32	40	36	45	8
R2 DB 8	30	97	130	120	101	108	104	108	4
R2 DB 9	31	90	90	94	91	93	90	93	3
AM R2 EB		**409**	**790**	**721**	**525**	**665**	**674**	**685**	21
R2 WB 1	32	90	56	233	53	53	52	66	15
R2 WB 2	33	113	246	169	118	158	141	236	78
R2 WB 3	34	28	183	218	28	41	115	28	-87
R2 WB 4	35	70	357	359	71	149	191	64	-127
R2 WB 5	36	72	125	127	85	125	121	79	-42
R2 WB 6	37	10	9	9	9	9	9	9	0
R2 WB 7	38	36	37	37	27	27	37	37	0
AM R2 WB		**377**	**1024**	**1447**	**485**	**553**	**786**	**520**	266

17:00-19:00

Route		PM Base	Run A PM All Sites + TEMPRO	Run B PM All Sites + TEMPRO + Dev	Run C PM All Sites	Run D PM All Sites + Dev	Run E PM All Sites + Capped TEMPRO	Run F PM All Sites + Capped TEMPRO + Dev	
R1 NB 1		30	66	48	25	25	45	27	-18
R1 NB 2		15	34	28	12	13	23	16	-7
R1 NB 3		13	57	45	13	13	35	23	-12
R1 NB 4		24	234	180	53	85	174	139	-80
R1 NB 5		40	114	111	73	62	111	92	-19
R1 NB 6		7	44	41	34	26	43	38	-5
R1 NB 7		28	52	49	46	43	49	48	-1
R1 NB 8		58	156	154	155	152	155	154	-1
R1 NB 9		14	20	18	20	20	20	18	-1
R1 NB 10		122	205	207	202	217	206	223	8
R1 NB 11		66	72	83	71	84	72	82	11
R1 NB 12		57	58	60	58	59	58	59	1
PM R1 NB		**457**	**1119**	**1032**	**761**	**799**	**991**	**880**	-119
R1 SB 1		55	104	120	65	111	95	104	9
R1 SB 2		56	91	117	59	61	79	107	29
R1 SB 3		147	516	618	185	424	488	600	112
R1 SB 4		18	17	16	10	16	16	16	0
R1 SB 5		56	46	45	46	43	46	45	-1
R1 SB 6		27	26	25	27	25	27	25	-2
R1 SB 7		24	26	25	26	25	25	25	0
R1 SB 8		21	20	19	19	18	20	19	-1
R1 SB 9		7	8	8	5	5	8	8	0
R1 SB 10		29	92	91	29	29	90	29	-1
PM R1 SB		**437**	**885**	**1011**	**633**	**757**	**832**	**974**	142
R2 DB 1		98	480	480	359	370	484	455	-9
R2 DB 2		88	84	86	56	56	80	80	1
R2 DB 3		7	24	23	19	17	23	21	-2
R2 DB 4		32	17	17	18	18	16	17	1
R2 DB 5		34	30	28	29	27	29	27	-1
R2 DB 6		98	41	41	98	42	99	41	2
R2 DB 7		23	24	30	23	25	23	27	3
R2 DB 8		111	115	127	112	120	130	128	29
R2 DB 9		54	54	57	54	58	54	58	4
PM R2 EB		**571**	**894**	**949**	**768**	**765**	**918**	**854**	-17
R2 WB 1		46	47	55	47	54	47	56	9
R2 WB 2		94	120	150	98	138	97	186	89
R2 WB 3		28	183	183	90	122	53	145	92
R2 WB 4		127	191	232	108	206	180	221	41
R2 WB 5		51	107	103	74	65	103	86	-17
R2 WB 6		10	3	3	3	3	3	3	0
R2 WB 7		97	97	97	97	96	97	96	0
PM R2 WB		**452**	**689**	**904**	**401**	**631**	**525**	**739**	234



	08:00-09:00		
		Run E	Run F
	AM Base	AM All Sites + Capped TEMPRO	AM All Sites + Capped TEMPRO + Dev
Average Delay per Vehicle (s)	106	130	130
Average Speed per Vehicle (mph)	20	18	18
Total Travel Time (hrs)	891	1139	1202
Total Delay Time (hrs)	464	647	666
Vehicles Active in the Network	1046	1408	1462
Vehicles Completed Trip	14684	16513	16996
Total Latent Delay (hrs)	1	182	328
Total Latent Demand	12	232	454
Total Peak Hour Veh Numbers	15742	18153	18912
Average Delay per Veh (s) (inc. Latent Demand)	106.4	164.3	189.3

	17:00-18:00		
		Run E	Run F
	PM Base	PM All Sites + Capped TEMPRO	PM All Sites + Capped TEMPRO + Dev
Average Delay per Vehicle (s)	70	227	244
Average Speed per Vehicle (mph)	25	13	12
Total Travel Time (hrs)	779	1646	1836
Total Delay Time (hrs)	321	1160	1296
Vehicles Active in the Network	629	1887	1983
Vehicles Completed Trip	15899	16529	17170
Total Latent Delay (hrs)	4	386	502
Total Latent Demand	0	891	1089
Total Peak Hour Veh Numbers	16528	19307	20242
Average Delay per Veh (s) (inc. Latent Demand)	70.7	288.3	319.7

Queue in Metres

Table 6.5: A38 / M5 Junction

	AM Peak		PM Peak	
Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	2036 Base + CD	2036 Base + CD + Woodlands
A38 Gloucester Road North	195	158	436	454
M5 East	251	285	413	484
A38 Gloucester Road South	30	30	436	429
M5 West	58	103	327	273

Impact

Approach Name	AM	PM
A38 Gloucester Road North	-37	18
M5 East	34	71
A38 Gloucester Road South	0	-7
M5 West	46	-54

Table 6.6: Aztec West Roundabout

	AM Peak		PM Peak	
Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	2036 Base + CD	2036 Base + CD + Woodlands
A38 Gloucester Road North (Ahead/Righ	313	293	13	11
A38 Gloucester Road North (Left)	37	46	11	9
Bradley Stoke Way	121	67	109	84
A38 Gloucester Road South	452	458	486	486
Park Avenue	4	4	200	180

Impact

Approach Name	AM	PM
A38 Gloucester Road North (Ahead	-20	-2
A38 Gloucester Road North (Left)	9	-2
Bradley Stoke Way	-54	-24
A38 Gloucester Road South	6	-1
Park Avenue	0	-20

Table 6.8 Woodlands Lane

	AM Peak		PM Peak	
Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	2036 Base + CD	2036 Base + CD + Woodlands
Woodlands Lane (Right)	311	33	252	409
Woodlands Lane (Left)	162	2	191	410
Bradley Stoke Way East	23	16	184	96
Bradley Stoke Way West	11	11	23	20

Impact

Approach Name	AM	PM
Woodlands Lane (Right)	-277	157
Woodlands Lane (Left)	-160	218
Bradley Stoke Way East	-7	-68
Bradley Stoke Way West	-1	-3

Table 6.9 Pear Tree / Bradley Stoke Way

	AM Peak		PM Peak	
Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	2036 Base + CD	2036 Base + CD + Woodlands
Bradley Stoke Way West	0	0	8	4
Pear Tree Road	0	0	9	4
Bowsland Way	2	2	7	5
Bradley Stoke Way East	1	1	31	4
Brook Way	4	4	57	17

Impact

Approach Name	AM	PM
Bradley Stoke Way West	0	-4
Pear Tree Road	0	-4
Bowsland Way	0	-2
Bradley Stoke Way East	0	-27
Brook Way	0	-40

Table 6.10: A38 / Hortham Lane Junction

	AM Peak		PM Peak	
Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	2036 Base + CD	2036 Base + CD + Woodlands
A38 Gloucester Road South	14	22	84	122
A38 Gloucester Road North	293	382	300	275
Hortham Lane (Left)	18	70	4	10
Hortham Lane (Right)	17	70	3	10

Impact

Approach Name	AM	PM
A38 Gloucester Road South	9	38
A38 Gloucester Road North	89	-25
Hortham Lane (Left)	52	7
Hortham Lane (Right)	53	7

Queue in Vehicles

5.75

Table 6.5: A38 / M5 Junction

	AM Peak		PM Peak	
Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	2036 Base + CD	2036 Base + CD + Woodlands
A38 Gloucester Road North	34	28	76	79
M5 East	44	50	72	84
A38 Gloucester Road South	5	5	76	75
M5 West	10	18	57	47

Impact

Approach Name	AM	PM
A38 Gloucester Road North	-6	3
M5 East	6	12
A38 Gloucester Road South	0	-1
M5 West	8	-9

Table 6.6: Aztec West Roundabout

	AM Peak		PM Peak	
Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	2036 Base + CD	2036 Base + CD + Woodlands
A38 Gloucester Road North (Ahead/	54	51	2	2
A38 Gloucester Road North (Left)	6	8	2	2
Bradley Stoke Way	21	12	19	15
A38 Gloucester Road South	79	80	85	84
Park Avenue	1	1	35	31

Impact

Approach Name	AM	PM
A38 Gloucester Road North (Ah	-3	0
A38 Gloucester Road North (Lef	2	0
Bradley Stoke Way	-9	-4
A38 Gloucester Road South	1	0
Park Avenue	0	-3

Table 6.8 Woodlands Lane

	AM Peak		PM Peak	
Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	2036 Base + CD	2036 Base + CD + Woodlands
Woodlands Lane (Right)	54	6	44	71
Woodlands Lane (Left)	28	0	33	71
Bradley Stoke Way East	4	3	32	17
Bradley Stoke Way West	2	2	4	3

Impact

Approach Name	AM	PM
Woodlands Lane (Right)	-48	27
Woodlands Lane (Left)	-28	38
Bradley Stoke Way East	-1	-15
Bradley Stoke Way West	0	0

Table 6.9 Pear Tree / Bradley Stoke Way

	AM Peak		PM Peak	
Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	2036 Base + CD	2036 Base + CD + Woodlands
Bradley Stoke Way West	0	0	1	1
Pear Tree Road	0	0	1	1
Bowsland Way	0	0	1	1
Bradley Stoke Way East	0	0	5	1
Brook Way	1	1	10	3

Impact

Approach Name	AM	PM
Bradley Stoke Way West	0	-1
Pear Tree Road	0	-1
Bowsland Way	0	0
Bradley Stoke Way East	0	-5
Brook Way	0	-7

Table 6.10: A38 / Hortham Lane Junction

	AM Peak		PM Peak	
Approach Name	2036 Base + CD	2036 Base + CD + Woodlands	2036 Base + CD	2036 Base + CD + Woodlands
A38 Gloucester Road South	2	4	15	21
A38 Gloucester Road North	51	66	52	48
Hortham Lane (Left)	3	12	1	2
Hortham Lane (Right)	3	12	0	2

Impact

Approach Name	AM	PM
A38 Gloucester Road South	1	7
A38 Gloucester Road North	16	-4
Hortham Lane (Left)	9	1
Hortham Lane (Right)	9	1

P
W

P
W
Sch

Sch

School

Development boundary

n

1:5000

0 250m

DRAFT

client:
[redacted]

project:
Woodlands

drawing title:
Site Boundary Plan

job number: **SWS103**
drawing number: **1002**
scale: **1:5000 @ A2**
drawn: **AJ**
date: **May 2019**
status: **Preliminary**

urbandesignbox.co.uk

Copyright of Urban Design Box. This drawing is for illustrative purposes only and should not be used for any construction or estimation purposes. No liability or responsibility is accepted arising from reliance upon the information contained within this drawing. DO NOT SCALE DRAWINGS.

Urban Design Box
UDB

REPRESENTATIONS TO SOUTH GLOUCESTERSHIRE LOCAL PLAN - PHASE 2: URBAN, RURAL AND KEY ISSUES

ON BEHALF OF SOUTH-WEST STRATEGIC DEVELOPMENTS

30th March 2022

grassroots PLANNING

Bristol North Baths
Gloucester Road
Bristol
BS7 8BN
t: 0117 930 0413 grassroots-planning.co.uk

REPORT CONTROL

Project:	Woodlands Garden Village
Report Type:	Representations
Client:	SWSD
Our Reference:	354/A3
Version:	V1

COPYRIGHT
This document must not be copied or reproduced in whole or in part without the written consent of Grass Roots Planning Ltd

1.0 INTRODUCTION

1.1 On behalf of South West Strategic Developments (SWSD) and the landowners, Grass Roots Planning have been instructed to prepare and submit representations to South Gloucestershire Council's Local Plan (SGLP) 2022 'Phase 2 – Urban, Rural and Key Issues' consultation.

1.2 This document sets out our thoughts on the Phase 2 document and the options set out for the strategy within the SGLP. We are also promoting a site for future allocation as a new Garden Village north of the M4 at Woodlands Golf Club, Trench Lane, Almondsbury, South Gloucestershire (henceforth referred to as 'Woodlands Garden Community' (WGC)) and extensive detail in respect to this site has already been submitted to the council as part of the now defunct Joint Spatial Plan and as part of the 'Phase 1' consultation that was undertaken in early 2021.

1.3 The West of England Combined Authority (WECA) is preparing a Spatial Development Strategy (SDS) which will set out the spatial strategy and development requirements for the WECA area that includes Bristol City, South Gloucestershire and Bath and North-East Somerset.

1.4 While we have some reservations about the Local Plan progressing in parallel, rather than after the SDS, it seems reasonable that the Phase 2 Local Plan Consultation Document assesses the more local issues while leaving strategic planning decisions to the SDS to determine. However, while some of these issues can be examined independently, there is also a lot of potential overlap.

1.5 Therefore, while undertaking a limited review of some of these more contained issues should not harm the plan-making process, the council must be careful not to pre-judge the spatial strategy that the SDS might select. This needs to be led by a robust and transparent sustainability appraisal of the available spatial options that avoids the mistakes that were made during the preparation of the Joint Spatial Plan (JSP), where a strategy that the council's own evidence base outlined as being less sustainable was chosen, contrary to the evidence presented, in a scenario that seemed to present a predetermined strategy and then simply bolt on the evidence to support it afterward.

1.6 A similar outcome must be avoided at all costs in the preparation of the Local Plan and SDS to ensure that these plans successfully pass through examination by PINs, because the last thing the Councils, the development industry or the general public want is another failed plan that delays the jobs, housing and infrastructure that the region acutely needs.

1.7 We hope that this will be avoided and are heartened to see in the consultation document that it has been made clear that the next stage of the Local Plan, informed by the SDS, will be to discuss with local communities where development and change is likely to happen. Any consideration of sites at this stage without the selection of the appropriate SA verified SDS would obviously be premature.

2.0 HOW MANY HOMES

Additional Homes for Bristol

2.1 We welcome the reference made to the fact that South Gloucestershire is highly likely to be required to plan for additional homes, over and above a narrowly defined housing requirement for the authority alone, to ensure that the significant housing requirements and needs arising in Bristol are met as close to its boundaries as possible. After all, SGC forms an important part of the Bristol Urban area and shares in the success of the city as a whole. Ignoring the needs of the city when the two are so closely interlinked, would not be an appropriate way to properly plan development.

2.2 Bristol is a tightly defined urban authority with practically no surplus land on which it can build the housing it needs, and particularly not family housing, having undertaken various reviews of its capacity to accommodate development and concluding that insufficient land exists to meet its needs. Therefore, we are glad a pragmatic approach is envisioned where overspill needs will be provided for within South Gloucestershire and hopefully BANES also.

2.3 This is particularly important given that North Somerset has recently confirmed that it cannot accommodate its own housing needs, let alone overspill need from Bristol.

Housing Need in SGC

2.4 The helpful graphic set out at page 16 of the consultation document is repeated below. This succinctly sets out how the overall number of homes that the new plan will need to plan for, and most importantly the number it will need to accommodate on new sites which it needs to show details of in terms of specific robust and deliverable allocations.



Figure 1. Extract of graphic in consultation document showing how many homes are required in South Gloucestershire

2.5 The 2021 Standard Method figures show an annual housing requirement of 1,353 for the South Gloucestershire Area – therefore the 24,354 figure shown in Step 1 above is correct and reasonable at the current time. However, this figure is now one year old and as NPPG (Reference ID: 2a-008-20190220) outlines, it must be kept under review and can only be relied upon for two years – given that there is potential for the Local Plan preparation timetable to slip this is particularly pertinent.

2.6 As set out earlier, the biggest current unknown is Step 2 – how much unmet need arising from Bristol will need to be met in South Gloucestershire. It is essential that this is known as soon as possible for the Council to plan properly to prepare a robust Local Plan for consultation later in the year, without such a clear figure any plan would not be robust and would be doomed to fail.

2.7 In relation to Step 3, the council have outlined that 12,777 homes are available with planning permission, there is no source for this identified so we are unclear where this figure has come from. We can only assume that this has been derived from the December 2021 annual monitoring report (AMR), however using this data we cannot reconcile with the 12,777 figure suggested.

2.8 Page 9 of Appendix A to the 2021 AMR summarises the supply of sites that have planning permission and identifies that in respect to the 2024-42 period that the New Local Plan will cover, the following supply of permitted sites is available:

- For years 2024-26 (of the five-year period the AMR assesses) = 2,878
- Period 2026/27 = 1,034
- Build out of Large Sites Post-2027 = 5,085
- **Total = 8,997**

2.9 For the avoidance of doubt, the above figures are those presented in the AMR but with windfalls deducted because by that point in the trajectory they do not relate to sites with specific planning permissions but are simply a forward projection.

2.10 As can been seen above there seems to be a disparity between our calculations and the council's. It seems that windfalls have been included which are obviously not planning permissions, so this needs to be clarified otherwise this calculation shows an artificially high allowance for extant consents. This is needed because the figure will feed into the housing requirement calculations and most importantly the quantum of development that the plan will need to specifically allocate land for. In terms of the potential to include windfalls in this figure, while they are not a 'planned' supply of housing we do acknowledge that many councils include them. However, in our view, windfalls should be seen as a helpful 'top-up' to the

housing supply instead, to ensure that housing supply is increased in accordance with national government's requirement to boost supply, as set out in the NPPF.

2.11 However, if the council is intent on including windfalls, then it must also include a non-implementation allowance which is common practice to provide flexibility, and this is often calculated at 10% of the total supply. Therefore, we advocate that this should be factored into the housing supply/requirements calculations in the event that council wishes to include the windfall allowance.

2.12 We support the council's intention to assess how best to maximise the use of land in urban areas and within existing settlements to determine the potential yield from this source, as a first step, to inform the next stage in plan making which will need to grapple with the politically sensitive issue of greenfield, and potential Green Belt, land release. But as you will read later, many of the areas that are being considered have limited land for specific allocations and any generalised allowance for such areas should not be counted towards a planned supply to offset the overall housing requirements, because such delivery is clearly windfall development which the council is already seeking to make an allowance for – to include further allowance from these areas without specific site allocations would in effect be double counting.

3.0 EMPLOYMENT LAND

3.1 We agree with the council that existing employment sites, and in particular town and other community centres should be investigated to see if non-employment uses, including housing, can be accommodated to make them more vibrant and support existing business and create new ones. However, that aim needs to be balanced against the need for traditional employment land and such uses often need to be located in existing urban areas and not simply pushed out to peripheral sites (for example car repair garages are often a tempting use to locate to fringes of towns but in fact they are required in the residential communities they serve) and many existing employment sites in SGC are very vibrant with limited levels of vacancy.

3.2 In terms of the second key decision that is set out in respect to this matter on page 18 of the consultation document, it needs to be borne in mind whether significant policy amendments are required to provide greater flexibility for existing employment areas to change, given that extensive permitted development rights are in place to allow for the majority of these changes to occur in any event.

3.3 We strongly support the council's intention to plan for the provision of a minimum of 10ha of new land to accommodate research and development uses and offices, in accordance with the Employment Land and Spatial Needs Assessment (ELSNA). It is also welcomed that the council acknowledge that in achieving the potential aim of adding vibrancy to existing employment and commercial areas, and in particular existing local and town centres, that such a strategy may displace existing users and this may require replacement employment land being provided (and likely allocated) elsewhere. It is therefore very useful that the council are examining which employment sites may change now, as this will guide the additional quantum of new employment land that may be required to be planned for as part of the New Local Plan.

3.4 We would suggest that the new employment land that may be required should also be incorporated into larger scale mixed use developments (such as the suggested Woodlands Garden Community) for a number of reasons:

- It will add vibrancy to these developments through a wider amount of usage and hence different activity through the day;
- It will provide employment opportunities on the doorstep of new residents to create the potential for a high degree of self-containment; and
- Mixed use developments have a greater propensity to be able to deliver serviced employment land to the market because of the effective cross subsidy that housing development provides to support the viability of the employment land offered.

3.5 While we support the identification at this early stage of the need to plan for the allocation of new employment land, we do not consider it to be aspirational enough. Currently the ELSNA identifies the following for the South Gloucestershire area (see section 8 of this report):

- Based on previous use classes 10.01ha is required for Research and Development and 0.03ha for Office use is required; and
- Based on the new use classes – 9.04ha of land is required for E-Uses and 6.59ha for B2.

3.6 However, we consider these to be baseline minimums, and a range of factors suggest a higher level of new employment land needs to be planned for.

3.7 It can be seen that the ELSNA clearly identifies the economic vibrancy of the area and the following extracts of their conclusions are relevant to guide SGC's decision making on the reuse of existing employment sites and in determining the quantum of employment land to plan for:

- High levels of demand (for industrial land) coupled with restricted levels of industrial land supply in many parts of the region is a risk to the future growth of the advanced manufacturing sector;
- Providing choice including a range of site types of varying sizes is an important consideration for future strategic employment land policy in the West of England;
- Spatial considerations in the industrial sector including the need to respond to growth demand for premises in locations in South Gloucestershire (such as Emersons Green) and along the M5 corridor. As with the distribution market, industrial demand is also increasing for smaller edge-of-town units;
- Policies should seek to protect existing industrial sites which remain competitive and attractive to occupiers;
- (In respect to industrial land) the growth of automation and economies of scale has increased demand for larger premises (often termed 'super sheds');
- The out-of-city centre office market is centred on the Bristol North Fringe, along with areas such as Keynsham in BANES and Portishead in North Somerset. Prior to the challenging market conditions stimulated by COVID, the out-of-town market was strong, led by key developments at Aztec West and Stoke Gifford. Keynsham also performed well in recent years;
- From a strategic and longer-term perspective, the West of England office market is constrained by constrained supply levels, particularly for Grade A space;
- As a result of growth shortages, speculative office development has become crucial to meeting demand; and

- As a result of the COVID pandemic, there is a reasonably strong likelihood that cities such as Bristol will become targeted for office relocations from London and other metropolitan areas. This should be considered in the development of the SDS.

3.8 The office market in the area has not been as significantly affected by COVID as first anticipated, and it is also subject to the uncertainty that relates to how much space will continue to be lost to residential conversion via Permitted Development Rights. In terms of the qualitative and quantitative issues surrounding supply of all employment land types the following points raised by the ELSNA are relevant to SGC:

- Future supply of office space is severely limited in Bristol beyond the growth zone of Temple Quarter, with intensifying pressures from Permitted Development Rights;
- Established office park locations in South Gloucestershire, such as Aztec West in Almondsbury, are unlikely to provide significant future supply (for office space);
- South Gloucestershire is projected to have an undersupply of 10.01ha, despite the significant supply of industrial land available at Severnside. This is not expected to reduce pressures on supply in the rest of South Gloucestershire, as certain businesses will not relocate due to operational and workforce requirements. Furthermore, development is accelerating rapidly and therefore Severnside cannot be regarded as a safeguarded source of longer-term supply;
- Beyond Severnside, there is expected to be a considerable shortfall in employment land suitable for storage and distribution uses in South Gloucestershire, particularly for smaller-scale premises in edge-of-centre locations like Emersons Green, Kingswood and Longwell Green; and
- Urban locations are required for last mile storage and distribution hubs.

3.9 These factors suggest a number of things to us that we urge the council to consider, including:

- While a large amount of supply of storage and distribution land is available in Severnside the analysis identifies, rightly, that not all demand for such space is in this location and it generally caters for very large-scale facilities.
- Additionally, the baseline ELSNA assessment of demand vs. supply outlines that additional storage and distribution land is not required in SGC, this is contradicted by the qualitative assessment that identifies that Severnside cannot be relied on as a safeguarded source of longer-term supply;
- Last mile logistics hubs need consideration in various locations in existing urban areas, or possibly on their fringes;
- Therefore, storage and distribution land needs to be allocated in other locations as part of the Local Plan to ensure flexibility in the supply; and
- ‘Hub and spoke’ office hubs within residential communities are needed to supplement more centralised and large office locations.

3.10 In respect to the 'Hub and Spoke' reference made in the ELSNA, recent experience is that small office/light industrial workshop uses that are well integrated into residential developments are both successful in design and placemaking terms but also highly sought after. Therefore, we urge the council to consider whether more of their emerging allocations, when these are formulated, should be mixed use in nature to allow a percentage of the site to be provided as residential compatible employment uses. This will provide vibrancy within such development and increase the propensity for them to become more self-contained, with obvious sustainability benefits.

3.11 All of these factors suggests that the demand for employment space in WECA as a whole, and SGC, is robust even taking into the effect of COVID19 on the office market. SGC also accommodates many of the largest and most successful employment hubs of the region. Given this level of demand it is extremely important that the level of employment land demand is not underplayed and is properly considered as part of the Local Plan, this is particularly salient given that the Green Belt designation that constrains much of the land that lies in close proximity to existing employment hubs where businesses is likely to want to locate to – this makes any ad hoc reaction to unanticipated demand in the future much harder to facilitate given Green Belt planning policy restrictions.

3.12 Given the pressure that PD rights applies to existing employment land stock, the council need to formulate a robust, but also flexible, allowance of new employment land allocations to cater for this, or alternatively implement article 4 restrictions to prevent such conversion. This is in addition to the extra land that may be required to compensate for more purposeful and planned redevelopment of some employment sites that the council are anticipating, and seemingly planning for as the Phase 2 consultation document acknowledges – and we flag where compensatory employment land allocations might be required later.

3.13 The conclusion of the ELSNA emphasises the need for flexibility, and we are sure that SGC will build in such flexibility into certain Local Plan Policies relating to employment land.

3.14 Therefore, in conclusion in respect to future employment land requirements and allocations, the council needs to be aspirational in determining the levels of employment land that they plan for as part of the new Local Plan and we would urge it to consider emerging figures from WECA as a basic minimum requirement to ensure there is flexibility in the market for employment land and economic development in the region is not hindered by a lack of supply and to cater for unknown factors such as the level of losses to PD rights conversions, unanticipated large scale inward investment and changing requirements related to the Net Zero agenda that require new sites to address. The risks of over supplying such land are minimal, it simply doesn't get built out within the plan period, whereas the risks associated

with constraining supply are much more significant including loss of jobs and the suppression of economic growth and prosperity.

The Employment Sites Being Considered for Change

3.15 Generally given the conclusions of the ELSNA and our position set out above we are in agreement with the council regarding the proposal to protect the majority of the employment sites in the area from change of use to non-employment uses.

3.16 Allowing more wholesale change of such areas would have significant knock-on effects for the local economy, with landlords pressuring businesses to relocate predicated on the hope value associated with residential redevelopment of existing employment sites. Given the vibrancy and low levels of vacancy in the majority of employment sites in South Gloucestershire this would be particularly damaging to the local economy.

3.17 We have a small number of comments on some of the employment sites that are being considered for change and these are set out in section 6 of these representations.

4.0 NEW STRATEGY – WHERE TO GROW AND PROTECT

4.1 We fully support the council's aim of revising their spatial strategy to respond to the climate change emergency, as the consultation document notes many of the building blocks that were consulted on as part of the phase 1 consultation are needed to achieve this. However, we would reiterate our previous concerns raised about Building Block 5 which relates to free standing new settlements.

4.2 We won't reiterate the representations that we made in March 2021 in full, but these contained the following points of objection to the option of focusing on free standing settlements which remain relevant today, particularly during the current economic climate where fossil fuels are becoming both costly and geopolitically unreliable:

- A free-standing settlement, particularly one located in the Buckover area, is highly likely to result in significant adverse effects in terms of environmental impact as a result of an increase in commuting with connected adverse environmental effects;
- The infrastructure costs associated with a free-standing settlement are much greater than other options available (such as urban extensions that would on the whole utilise existing and committed infrastructure – such as the existing Metrobus network) undermining their viability and ability to deliver much needed affordable housing. The proposed Buckover settlement for example requires £30m investment in a Metrobus link and as yet unquantified extensive improvements to Junction 14 on the M5 to serve it as a bare minimum in transport terms; alternatives such as the Woodlands Garden Community (WGC), which would in effect be an urban extension to Bristol, would not require such investment and can therefore deliver affordable housing and other infrastructure improvements that benefit the wider community here, not just future residents;
- The SA appraisal process of proposed development sites undertaken as part of the JSP clearly identified that Buckover in particular was not a sustainable location when compared to the other alternatives available; and
- The Council's own sustainability assessment work undertaken by LUC in support of the Phase 1 Consultation Document clearly identifies the 'building blocks' that score most highly, which the SGLP should pursue – namely, after 'intensifying existing urban areas' – 'urban extensions to Bristol' are the most sustainable development option.

4.3 While we welcome the early analysis of the potential for urban intensification and which rural settlements should accept growth in advance of the SDS providing a clearer direction on the overall quantum of housing that needs to be planned for and in accordance with what spatial strategy, it is clear from SGC's own evidence that the most sustainable option for growth includes urban extensions to existing urban areas. As Bristol is the biggest urban area in the

region, where the majority of demand for housing is emanating from, it is an obvious conclusion that urban extensions to the city are needed and the council should be assessing potential locations for this now via a detailed green belt review.

4.4 Such a review should not repeat previous mistakes of looking at large swathes of land, while that is a good starting point it must then look at the individual aspects of the development sites that have been put forward to the council, and assess their impacts on the main purposes of the green belt specifically so these development options can be better assessed, and potentially ranked in respect to their impact.

4.5 Turning specifically to the two building blocks that the phase 2 consultation focuses on – 'Urban Lifestyles' and 'Creating Sustainable Rural Villages', we agree with the council that an analysis of both of these topics can be undertaken independently of the SDS, although it is not an ideal scenario.

5.0 URBAN LIFESTYLES

5.1 Focusing on the redevelopment of existing urban areas, where they would not be detrimental to existing living conditions of the economic viability of such areas, should clearly be prioritised as part of the new Local Plan as the use of previously developed land is clearly supported by national planning policy.

5.2 The early assessment of these areas will also give the council an indication of the potential capacity that this source of supply will give them, allowing them to better identify the quantum of housing that needs to be delivered on greenfield sites in order to meet identified housing requirements.

5.3 However, this assessment needs to be mindful it does not overstate the capacity of such areas as that would then have the effect of underplaying the extent of greenfield land needed to meet housing requirements, which if insufficient land is selected and overinflated density targets for urban areas are not met, could severely inhibit the supply of housing land and not only fail to accord with the requirements of the NPPF – but also exacerbate already significant affordability issues faced in the region. It might also prevent a balanced portfolio of land supply being delivered, with an overreliance on complicated PDL sites that are costly to develop, leading to viability issues that will prevent the full delivery of policy compliant levels of affordable housing.

5.4 We support the analysis of density and the setting of a range that would be appropriate for different existing urban locations. These should differ depending on the location of sites and there character – for example a site in Chipping Sodbury, where taller buildings might not be appropriate and parking requirements higher because of the level of public transport provision available, is unlikely to be able to appropriately accommodate higher densities that a more urban location that lies in close proximity to a large number of job opportunities, has extensive public transport offerings and is more suitable to accommodate taller buildings.

5.5 Our specific comments on the new change in approach set out in summary on page 26 of the consultation document and in the following sections are as follows:

Specific Policy Direction

Private Amenity Space

5.6 We support the council's policy aims of providing private amenity space to dwellings, because outdoor areas are very important for both wellbeing of residents and for practical reasons such as the drying of washing.

5.7 To achieve this we fully support the application of a policy that requires a minimum area of outdoor space to be provided to every dwelling the 5sqm minimum requirement for flats is a reasonable proposal in this regard.

5.8 The only concern we have regarding this is the treatment of apartments. Having worked on planning applications in SGC that have sought to meet this requirement it is apparent it is unworkable in its current format because the only way of achieving this is to provide large scale balcony areas to any units above ground floor level. This is inappropriate in some locations and places a big design constraint on the development of apartment blocks, particularly in more sensitive areas such as locations within or adjacent to conservation areas and listed buildings.

5.9 Additionally, a communal garden area is often far more usable than the smaller individual areas that the policy currently seeks, it allows a larger consolidated area to be provided that can be used for larger gatherings, children's play and still be designed with an area to dry washing and raised beds for planting. Such areas can still be made exclusively private to the residents of each individual block and a shared area often helps community cohesion as it allows residents of the said block to meet and socialise in a private space – in much the same way as it occurs in historic parts of Bristol where shared garden areas are very successful and attractive to residents.

5.10 However, we do note that in some instances the potential measures the council identify might be appropriate – i.e. space to the side of units, decked areas over parking etc. but even in some of these cases, communal space for a small number of units could be a better option.

5.11 Therefore, we ask that flexibility is built into any policy in due course to ensure that a certain amount of external space is provided to all dwellings, but in the case of apartments such space can be provided either via private space adjoining the unit or in a larger communal space that is designed in a way to be privately accessible to the occupants of the apartment block alone. This will allow flexibility to react better to certain design requirements, which might dictate that an extensive number of balconies are inappropriate, or if a communal area is considered more useable.

5.12 If this flexibility is not built in, we consider that the policy may be unsound and may undermine the ability for the urban areas being considered to meet the density targets currently envisaged for them, because individual space will be much harder to achieve on denser schemes.

Parking

5.13 We agree with the council that a variable parking standard is needed in Urban Lifestyles developments. However, even within that category differing levels of parking are likely to be required – as explained earlier the parking demands in locations such as Chipping Sodbury/Yate will be different to those in the Northern Fringe of Bristol.

5.14 To address this we agree that an accessibility assessment approach would be a useful tool in determining whether a reduction in parking standards is acceptable. However, such an assessment should not just apply to Urban Lifestyle sites. Any site that can demonstrate via an assessment that it is accessible to everyday services and employment, and that access to public transport is good, should have the ability to plan for lower levels of parking if there are no parking management issues in the area. BATHNES already implements such a policy which allows lower levels of parking to be delivered if an Accessibility Assessment is undertaken and certain scores are met.

5.15 Accordingly we request that the Local Plan policies once developed include this flexibility to allow an accessibility audit to determine if lower levels of parking are considered acceptable.

5.16 We would also highlight that an accessibility assessment of sites would be a useful tool to apply when considering allocations beyond the Urban Lifestyles building block, and these assessments should be undertaken as part of the SA process to determine the most sustainable location for new development where private transport movements can be minimised to ensure that the climate change emergency is being taken seriously in the council's emerging spatial strategy.

5.17 Finally on this subject area, we fully support the potential for more innovative design solutions being suggested for parking areas by the council. Often parking can dominate street scenes and measures such as parking to the side of plots, undercroft parking and integrated garages should be encouraged in all new developments (although often highways authorities don't consider garages to count as useable parking because they are often used as storage – so a shift in attitude may be required). We also note the concerns raised about courtyard parking but these should continue to be used as an important tool in delivering parking in less visible locations, which can be successful if properly designed and landscaped.

Open Space

5.18 We note and appreciate the council's comments regarding public open space (POS) provision in Urban Lifestyles locations but are concerned that diluting the provision of POS in such locations, where it is most needed to provide recreational space in an otherwise heavily urban area, is not necessarily the right approach.

5.19 We note the examples that the consultation document gives (Goldsmith Street, Norwich, Derwenthorpe, York etc.) where recreation has been built into streets and we strongly support this, in fact we are currently involved in a 1,700 home development in Frome that is trying to incorporate these types of spaces. Such an approach will assist in meeting the requirement that all streets will be tree lined as required by paragraph 131 of NPPF, soften street scenes and make them more attractive and less car dominated, as well as assist in cooling urban areas in summer to assist in tackling climate change.

5.20 However, these spaces are not a panacea, they fulfil limited recreational needs but do not allow for most formal sports, youth recreation where larger buffers with residential properties are more appropriate and dog walking for example.

5.21 Therefore, while we consider that the 'reclaiming' of streets by people from the private car is a good objective and the principle of doorstep play should be embraced by the council on all development sites, not just Urban Lifestyle areas, we have to be realistic about how much useable space can be delivered in these areas.

5.22 Therefore, while distilling the need for playing pitches from these areas to offsite provision and allowing for a small allowance to be made for doorstep play to contribute towards POS requirements seems sensible, we object to significant reductions in the POS requirements for these developments. This is because access to recreation space in heavily urban areas is incredibly important for health, wellbeing and community cohesion as they are an important meeting point for residents. The council must not reduce these requirements too much and try to cram as much development into these areas as possible, at the expense of POS. Finally, if playing pitch provision is to be provided offsite, they must allocate sites to provide new community playing facilities.

Emerging Density Policy

Accessibility

5.23 In terms of the general emerging aim of this policy, namely, to ensure that the efficient use of land in accessible areas is maximised, this is strongly supported. We also do not disagree with the general locations that the council shows on its interactive map, which are on the whole existing centres that offer a range of facilities, shops and employment opportunities that allow future development to maximise sustainable forms of transport while also assisting the council in its other aims of supporting the viability and vitality of such centres through increased footfall.

5.24 There is however a range of concerns with the approach being taken to achieving these aims.

5.25 Firstly, the current locations that have been selected are either existing town centres, high streets and what is described as transport nodes (the interactive map refers to them all as 'Transport Nodes' which is confusing).

5.26 By focusing on the nodes that have been selected the council may miss the opportunity to select other urban areas for intensification that, while not falling within these areas, offer access to the range of everyday facilities and jobs that make non-car travel a realistic prospect.

5.27 There are many examples of such areas but two very simple examples are given below.

5.28 Figure 2 shows the general location of a range of facilities that are located on Pear Tree Road and adjacent streets, this location provides x2 supermarkets, a primary school, health centre, takeaways and a range of other everyday facilities, it is also closer to the significant number of job opportunities available in Bradley Stoke and Woodlands Business Park than the centre of Bradley Stoke which has been selected as a location of intensification.



Figure 2. Location of Pear Tree Road Facilities (shown with yellow star)

5.29 Another simple example is the local centre based on the Abbots Rd/Memorial Rd/Common Rd junction in south Hanham. Here there is a range of everyday facilities including a convenience store, butchers sports centre, primary school, takeaways, hairdressers etc. A range of bus services are also available here. Many of the everyday facilities that would encourage people to utilise sustainable transport options are located here and the fact that the Hanham Hall example given by the council as an example of successful higher density development lies in close proximity to the location shown in figure 3, underlines the fact that a much broader area than that shown on the current mapping would be suitable for higher density housing and sites within close proximity to such areas should be prioritised in terms of searching for specific sites to allocate.



Figure 3. Local Centre at Abbots Rd/Memorial Rd/Common Rd junction

5.30 There are many other examples that identify that much of the urban area can be a sustainable location where development should be considered acceptable in principle and where higher densities encouraged. Considering this we would recommend that the current approach is revised, and instead sites, not whole areas where no redevelopment opportunities might exist, should be assessed individually based on accessibility criteria as we have mentioned earlier in this document.

5.31 In respect to accessibility we also advocate that a walking distance of over 800m is also likely to be appropriate in determining whether a site is accessible or not. The National Travel Survey (NTS): 2019, published in August 2020, provides details of all trips per person per year, and is shown in figure 4 below. This provides clear evidence of the relationship between distance and probability of use of different modes of transport. The analysis shows that walking is the dominant mode for trips under 1.6km (79.81%).

Modal Split by Distance							
Distance	**Car Driver**	**Car Passenger**	**Bus**	**Train**	**Walk**	**Cycle**	**Other**
0 - 1.6km	11.26%	6.58%	0.70%	0.00%	79.81%	1.06%	0.58%
1.6 - 3.2km	36.98%	21.94%	5.03%	0.07%	31.03%	2.85%	2.10%
3.2 – 8km	51.59%	27.22%	9.88%	0.63%	4.04%	2.40%	4.24%
All Journeys	39.89%	21.01%	5.28%	2.23%	26.23%	1.70%	3.66%

Figure 4. Proportion of Total Trips and Mode and Distance

5.32 For distances over 1.6km but less than 3.2km, use of a car is the most popular mode of travel (58.9% for car driver and passenger), while walking is the second most popular mode, chosen by almost a third of people (31.03%).

5.33 The NTS is consistent with guidance in the IHT document Providing for Journeys on Foot (2000). This identifies that the preferred maximum walking distance is around 2km. DfT guidance contained within Local Transport Note 1/04 – Policy, Planning and Design for Walking and Cycling shows that the mean average length for a cycle journey is around 4km although journeys of up to three times this distance are not uncommon for regular commuters. The recent development of electric cycles is such that average journey lengths are likely to increase.

5.34 This provides clear evidence that sites of at least 1.6km from clusters of facilities should be considered as sustainable in terms of their ability to promote sustainable transport options. Therefore, we suggest that the council reconsider framing their assessments in terms of the 800m radius.

5.35 The assessment of accessibility must also be used to determine the suitability of new sites and general locations for strategic development, as the principle of sustainable development hinged on providing new dwellings and jobs in locations where suitable transport options can be utilised is equally applicable in this context as it is in determining where higher densities might be appropriate. In this context we support the council's acceptance (see page 40 of the Phase 2 document) that the following criteria are important:

- access to Metrobus rapid transit and Strategic Cycle Routes
- the level of access to shops, facilities, services and recreation

5.36 Both of these factors should be used not just to determine where higher density development would be appropriate but also where new greenfield development should be located, if the council are serious about creating a sustainable pattern of development to help meet its obligations under the Climate Change Act and declared Climate Change Emergency.

5.37 In conclusion, the approach being taken here is far too crude. What needs to happen is a review of specific sites because there is little merit in selecting an existing urban area where they may be little or no opportunities for redevelopment – what the local plan must assess is actual sites that have a credible chance of being developed within the Local Plan period, and crucially a supply of sites that can assist the council in continuing to deliver a five year housing land supply.

Density Typologies

5.38 The work undertaken by the council in the form of the Density and Character Study (DCS) (January 2022) is commendable. It examines the various historic patterns of development in the various urban areas in a thorough way and gives the reader a clear impression of the potential development options that can be recreated in new developments to push densities up, when compared to larger areas of places like Bradley Stoke, Yate etc. where successive estates built over the last 50+ years have not made the most efficient use of land and have generally delivered development that has not exceeded 30 dwellings per hectare (dph).

5.39 In our view the use of a greater proportion of terracing in new developments, combined with reclaiming streets from the car should allow for new development to greatly exceed 30 dph, but some of the densities being suggested for the various centres are extremely high in our view, including:

- Bradley Stoke – 65-100 dph;
- Cribbs Mall – 110-160 dph
- Filton Airfield – 105-160 dph
- Longwell Green – 100-130 dph

5.40 The council's own evidence set out in the DCS clearly identifies that the only typologies that would realistically achieve these sorts of densities would be the apartment or Victorian-Edwardian High Street typologies, with the latter consisting of a large proportion of flats above shops. While the case studies that the DCS provides are useful, for the higher density areas they include small sites (i.e. Gainsborough Square, Kendall Road) that do not provide appropriate examples for larger areas of redevelopment and mainly consist of public sector funded schemes which will be able to deliver a higher proportion of apartments than houses, due to the availability of public subsidy.

5.41 This shows that if the densities for these areas are to be achieved, they would most likely deliver almost exclusively apartments, or a very high proportion of them.

5.42 In addition all of the other assessed areas outside of those identified above have upper density ranges that are also extremely high which means achieving them will also result in a very high proportion of flats being delivered.

5.43 While we are still awaiting an updated SHMA as part of the Local Plan and SDS evidence base the '*Wider Bristol HMA Strategic Housing Market Assessment: Volume Two (November 2015*)' set out the following affordable housing mix by household affordability for South Gloucestershire:

	Unit Type	Percentage
Flat	1 Bedroom	12.6%
	2+ Bedrooms	15.3%
House	2 Bedroom	28.5%
	3 Bedroom	35.2%
	4+ bedroom	8.4%

Figure 5. Affordable housing mix by household affordability 2016-2036 (Source: ORS Housing Model)

5.44 This shows that the need for apartments is relatively low, even in the affordable market. Open market demand is normally even further skewed towards houses rather than apartments and the Council needs to be mindful of this when formulating density requirements that will deliver a very high proportion of flats. Therefore, an updated SHMA assessment that establishes the housing mix that should be planned for is required before the density ranges for these areas is finalised to ensure that what is being planned actually reflects the housing requirements of the area.

5.45 In light of this evidence, and likelihood it will not have altered significantly, the Council needs to consider whether the demand that is driving house price growth and worsening affordability in the area is predicated on high levels of demand for apartments rather than larger family housing. It is our view that while there is demand for apartments it is not as strong as family

sized homes given the overspill needs arising in Bristol in particular, where a large proportion of housing being delivered in the form of flats, rather than family homes with gardens. Therefore, the densities being chosen need to be reviewed in this context to ensure that an appropriate number of family sized homes can be delivered alongside apartments in these areas.

5.46 In conclusion while we strongly support the efficient use of land and raising densities significantly above what has been delivered in the areas assessed historically, we urge the council to be realistic in terms of how it is assessing this issue because if it is not it will again set an unrealistic yield for these areas which will undermine the housing supply in the area and set the plan up to fail in terms of housing delivery. Accordingly, we recommended that the proposed densities are reviewed again, particularly against the SHMA requirements and commercial demand, to reflect the higher demand and need for family sized properties, and the chosen density ranges reduced to reflect this.

6.0 SPECIFIC URBAN LIFESTYLES AREAS

Introduction

6.1 In general terms the overall aims that are identified for these areas are supported, however deliverability and the robustness of any housing supply that may be identified from this source needs to be treated carefully and the council needs to be realistic in respect to whether they are in fact deliverable and can be fully relied upon.

6.2 Many of these opportunity sites have existed for a significant amount of time – for example the extensive areas of Bradley Stoke Centre car parks could have been developed in the past and it is thought that this would have happened given the acute demand for residential land that has occurred over recent years as a response to ever spiralling house prices. However, the fact is many of these sites have sat dormant for many years without any significant developer interest, even though their more intense development would have been supported under the current planning policy framework as they lie within existing established boundaries and policy supports the efficient use of urban land.

6.3 We acknowledge that some of these areas have been subject to various changes of use under permitted development, and smaller scale redevelopment proposals, usually by small scale developers – however there has been no significant large-scale redevelopment of such areas or interest from the types of developers who would be required to deliver the sort of extensive redevelopment that is envisaged. Currently there is no indication in the evidence base or from the development industry directly that wide ranging redevelopment of existing urban areas such as those selected, many of which currently have many different uses, occupiers and owners – is viable on the potential scale envisaged and without that the deliverability of this source of supply must be questioned.

6.4 We acknowledge that such development might be taken forward by a non-plc developers such as a pension fund, affordable housing provider or build to rent company. However, for this supply of housing to be credible and robust it must be proven to be deliverable with actual developer interest identified in this sort of site.

6.5 We now make specific comments on some of the locations being considered.

Bradley Stoke Town Centre

6.6 We have limited comments on this area other than setting out that we agree with the council's assessment that there are limited redevelopment opportunities here. Apart from a small

(0.35ha) site owned by SGC themselves a simple analysis of the area undertaken via aerial imagery, land ownership searches and planning history assessment identifies that apart from the large car park that services the retail units very little space exists to develop.

6.7 In terms of any potential development of the car park areas it is pertinent to note that the land has not been put forward by the landowners as part of the site submission process and any development of this land would be expensive and complicated given the need to retain the parking areas to serve the retail (otherwise the viability of the centre may be adversely affected) and as set out earlier in this document existing planning policies would support such a proposal, but none have been forthcoming. Therefore, there is no evidence to suggest a scheme of this nature is viable or deliverable.

6.8 The council's interactive map shows no other proposed specific allocations in this area.

6.9 Therefore, we would suggest that when the council come to formulate the housing trajectory and requirement for the new Local plan no allowance should be allowed for supply arising from this area as it can't be relied on with any certainty and should instead contribute to potential windfalls.

Cribbs Mall and Retail and Leisure Parks

6.10 The council's interactive map that is part of this consultation does not show any specific allocations for this area other than employment land to be safeguarded. The following site submissions have been made in the past in this location:

Site Reference	Address	Comments
SG040	Land South of Merlin Road	Promoted as a commercial/leisure use that has now been granted planning consent and implemented.
SG547	Highwood Road Cribbs Causeway	Suggested that this site could accommodate 17 dwellings but might also be suitable for commercial use. Recent application PT18/0992/R3F has secured new access through this land with associated landscaping and no other development proposed
SG442	Land at Jupiter Road, Patchway	Site submission proposed 160 units – either as C3 or C2 uses. Site is now proposed to be safeguarded for employment in current interactive maps.

Figure 6. Summary of Site Submissions Made in Cribbs Causeway Area

6.11 Therefore, it is clear that there has been no credible interest in the large-scale redevelopment of this area. Therefore, while the council's identification for 'transformational change' of this area is laudable there is currently no evidence to suggest it will happen, including commercial interest in such a scheme that would rely heavily on the reuse of existing car park areas associated with the Mall. Without the supporting evidence of site submissions made on behalf of the owner of this land at the very least, it would not a robust strategy to rely on any significant supply of housing from this area as part of the emerging plan.

Former Filton Airfield

6.12 We support the efficient use of this land and have no significant concerns regarding YTL increasing the number of homes they deliver on their land here, as long as suitable levels of increased infrastructure provision is delivered alongside this, including the delivery of the train station to serve the development, and the new Arena, are secured via cast iron guarantees.

6.13 We also would reiterate our comments made elsewhere that the suggested densities being sought will lead to a very high proportion of flats being delivered here. The council therefore needs to be satisfied that the available evidence (ideally in the form of an updated SHMA) supports this or whether lower densities that will deliver a higher proportion of family houses should be considered instead.

Patchway

6.14 We fully support the aim of utilising development to create a more coherent centre here as well as the existing train station to maximize sustainable transport options. But, as with many of the other areas identified, specific redevelopment opportunities are limited that the quantum of housing that will be delivered here is likely to be fairly low.

Filton Town Centre

6.15 We agree with the council that this area should be enhanced through public realm improvements and works to improve the permeability and connections in this area as the existing road infrastructure currently make this very disjointed, which could be greatly enhanced if its individual areas were not severed from one another.

6.16 In respect to proposed site NF004 that consists of the southwestern edge of the business park that lies on the north-eastern edge of Filton Town Centre, we note that two site options are being considered: the first involves keeping the site wholly in employment use; the second allowing changing part of the site to residential as part of a mixed-use redevelopment.

6.17 The site is at the core of aerospace and other high tech engineering focused uses that forms an important part of SGC's economy and the Employment Land Review recommends that it be safeguarded for employment uses. The landowner's agents in making submissions to the call for sites (ref: SG436) clearly set out that even when the site becomes available for redevelopment in years 11-20 of the plan period, it is envisaged that any development would be employment-led.

6.18 The council has identified that approximately 350 homes could be provided as part of a mixed-use scheme, which based on the envisaged densities, would require between 3.9ha and 7ha of the overall site area of 12.2ha to be developed for housing, so potentially over 50% of the site. Such a land take will obviously impact the site's ability to be flexible in accommodating a range of employment scales and the presence of housing, where there is currently none within the site boundary, will preclude certain employment uses that are not compatible with residential uses.

6.19 Therefore we strongly support option 1. However, if the council were to progress option 2 instead, a compensatory new allocation of employment land will be need elsewhere given that the ELSNA considers this employment land to be needed to sustain the local economy (also see section 3 of these representations).

6.20 We have no concerns regarding the proposals set out for the other potential allocation sites in the Filton area.

Stoke Gifford District Centre, Parkway Station to Abbey Wood/UWE area

6.21 We agree that the presence of Parkway Station and the Metrobus route make this location a highly sustainable location for development. Unlike many of the other areas selected it also has a small number of specific sites available for development, such as the site previously subject to the permission to relocate Bristol Rovers FC ground to (Site NF008), which should allow for some housing supply that should be specifically identified rather than being covered by any windfall allowance the council might adopt.

6.22 While we do not fully agree that the area suffers from poor cycling and walking route quality and legibility, it could be improved and therefore a master plan is welcomed. This will add further robustness to any allocations and make sure they are deliverable.

6.23 We would again caution against the density range being considered and suggest that this be reduced slightly (we suggest 60-100 dph) to allow for more family homes, given that site NF008 lies adjacent to Cheswick village where larger family homes have been very popular and are in demand.

6.24 In respect to site NF001 (Land behind Brins Close) the proposal is to accommodate 60 dwellings on a site just under 1ha in size. Given the condition of the site, which is very overgrown and accommodates a large number of trees and areas of thick vegetation, we would question how this can be logically accommodated whilst also delivering a suitable level of Biodiversity Net Gain (BNG) and ecological connectivity that the emerging policy suggests should be delivered here. The emerging policy of achieving 10% BNG will be a particular barrier to achieving the yield suggested and based on recent experience of this issue will require a significant proportion of the site to be retained in its current condition with some improvements in terms of management. Therefore, we suggest that the council reviews the site in this context and put forward a more realistic yield.



Figure 7. Site NF001 showing its overgrown nature

6.25 In respect to site NF008 (land at UWE) we fully agree that this site should be specifically allocated for development and given that it lies directly adjacent to both residential and employment areas a mixed-use scheme here seems most appropriate – therefore we support option 2 being considered by the council i.e. 160 homes, 50,000m2 of employment and educational uses.

6.26 We also note some additional allocations on the fringe of this locality. NF002 (Land on North East side of Old Gloucester Road) lies directly adjacent to the Harry Stoke Neighbourhood and the M4 Motorway; in respect to the latter feature it is puzzling that noise is not referenced in the design requirements relating to this site. Having experience of sites adjacent to Motorways (having recently gained consent for land in North Somerset immediately adjacent to the M5) it is common, if not essential, that a noise bund would be required to shield any development from adverse noise impacts. Given the linear nature of the land it may be impossible to provide what is a larger engineered feature whilst retaining a similar linear area of developable land for housing. We have similar concerns regarding proposed allocation

NF003 (land at Players Lane), which also lies adjacent to the M4 and no reference is made to addressing noise impacts to ensure this site is developable. Therefore, until detailed noise assessment work proves that these sites are developable, we object to their inclusion as these allocations are unsound because their deliverability is unproven. This should be identified now as part of the emerging design criteria for both sites.

Emersons Green Town Centre

6.27 As the consultation document sets out Emersons Green has been constructed relatively recently and while there may be some capacity for small scale infill and redevelopment this would be captured in the council's windfall allowance. The potential that areas of car parking could be redeveloped is also questioned as these areas are heavily used and the comments we have made elsewhere regarding the viability and commercial interest in such a proposal are relevant to this area also. While we do not disagree with the aims and objectives set out, we do not see the potential for any credible supply of housing to come forward from this area, other than via small scale windfalls that will be accounted for in the council's idented supply figures already.

6.28 To the east of Emersons Green Town Centre lies Lyde Green and a series of allocations are proposed on its eastern edge – EF001 and EF006. We have no concerns regarding these allocations and have no significant issues with either of the development options being considered for EF006, which focus on whether or not an element of employment land should be retained. We would only identify that if the site were considered to be changed from an employment allocation to residential, as the council have identified elsewhere in the Phase 2 document, new land of the same scale should be identified elsewhere in compensation.

Downend Town Centre

6.29 We have no concerns regarding the proposals for this area and the two small allocations that have been specifically identified, although given that EF010 will deliver just 10 homes we would suggest that the scale of this site does not warrant a specific allocation and it should be captured as a windfall in the same way all 10 unit or less schemes normally are.

Staple Hill Town Centre

6.30 Again the principle aims for this area and the emerging policy are considered to be suitable. In respect to the specific allocations being considered they seem logical, however if site EF011 (Exhibition House) were to be lost from employment use then compensatory new employment land must be allocated elsewhere. Given the dense nature and intensive

coverage of the site we would suggest that a modern employment development of a similar floorspace would result in more than the 0.47ha site that accommodates it being required, therefore a slightly larger compensatory allocation should be considered. The retention of the residual part of the land in employment use is also considered problematic (retained site 27) – because of the site's proximity the protection of employment land may preclude presential uses in any event due to noise, dust and traffic impacts. Therefore, the wholesale redevelopment of the wider site should be considered, with compensatory new employment land allocations made, or the site as a whole retained in employment use.

Kingswood Town Centre

6.31 We full support the master plan led approach to the regeneration of the Kingswood Town Centre area and commend the council for the work undertaken to bring this to fruition.

6.32 In respect to site EF003 (Lucas Works) we think that a mixed-use scheme for this site would be most appropriate given its proximity to the Town Centre and the potential ability for it to accommodate a more residential compatible mix of employment uses that might complement the town centre. Therefore, we support option 2, however with the normal caveat that the lost employment land must be compensated for in the form of a new allocation elsewhere given the conclusions of the ELSNA discussed elsewhere.

Yate Town Centre

6.33 We agree with the council that this area is a popular and vibrant shopping area but does require investment to make it more attractive and enhance its longer-term viability. This could involve the redevelopment of the centre and it would be appropriate to consider a broader range of uses including residential to make the area more active during wider periods of the day. However, the site is currently fairly intensively developed in terms of coverage and many of the uses that are present here would need to be retained or re-provided for as part of any redevelopment to continue to allow the centre to serve the community successfully.

6.34 Therefore, any dwelling yields would need to reflect this and be realistic as to the scale of apartments, heights of buildings etc. that can be feasibly provided here. We support the master planning approach being advocated and suggest this needs to be advanced quickly in order to provide the council will a robust land budget on which to determine a dwelling yield from any redevelopment proposals, along with whether viability issues would undermine the delivery of affordable housing.

Station Road Yate

6.35 We note the council considers this area as an opportunity given its access to the train station that will soon provide enhanced services to Bristol. Previously, as part of the JSP, the wholesale redevelopment of the existing commercial areas was considered, with employment land distilled to the eastern edge of Yate. We previously objected strongly to this suggestion given that the vast majority of the employment land is intensively used with limited amounts of vacancy – any wholesale redevelopment would have impacted these businesses and would have also potentially been unviable, with the larger proportion of this area not being suggested for redevelopment as part of the council's call for sites.

6.36 We are now heartened to see the council recommending that the employment land here is protected and we fully support this.

6.37 This will mean that redevelopment opportunities are limited, and therefore while small scale infill and intensification may be appropriate this will not yield large numbers and will in effect be windfalls. As a result, we do not consider it appropriate to assume any significant contribution towards housing supply from this area other than that which will form part of the windfall allowance.

Chipping Sodbury and Thornbury Town Centres

6.38 We have no significant concerns about what is suggested for these areas and support the intention that new development will add to the vitality. However, redevelopment opportunities are limited here so again this will be captured via windfall allowance.

Conclusions in Respect to identified Urban Lifestyles Areas

6.39 As we have set out in this section many of the aims for the urban lifestyle's areas are supported by us and are laudable.

6.40 Our main concern relates to the potential that the council will assume an unrealistic yield of housing from these areas, where on the whole specific sites have not been identified and therefore the deliverability for any allowance made must be questioned.

6.41 The redevelopment of existing sites in urban areas is normally accounted for via the allowances made in housing trajectories for windfalls – because that is exactly what such development is, sites that are not currently identified in a plan but lie within areas where generalised planning policies allow them to come forward. As we set out earlier in these

representations the council's emerging thinking already seems to make an allowance for a continuing trajectory of windfalls based on current rates that have been set out in their most recent Annual Monitoring Report.

6.42 That is a perfectly acceptable way forward, but such windfalls have to come from somewhere – i.e. redevelopment opportunities within existing urban areas which are likely to be in the areas that are identified under the urban lifestyle's methodology. This is in much the same way as they occur today, via unexpected redevelopment opportunities when commercial sites close and existing buildings repurposed (i.e. via permitted development rights for example). Current policies already seek to maximise the use of such sites and emerging policies in this regard are not so fundamentally different that they would justify inflating the contribution that windfalls will make to housing delivery in the future.

6.43 Therefore, while we want to see the council continue with its policy aims for these areas and the adoption of policies that will aim to use existing land in these sustainable locations efficiently, we urge the council not to rely on a large amount of housing supply from these sources because they are not specific allocations and in effect will replicate the contribution that windfalls will make to the supply, which we consider will result in affectively overstating the contention they will make to housing delivery through double counting.

7.0 CREATING SUSTAINABLE RURAL VILLAGES AND SETTLEMENTS

7.1 We support the Council's strategy of considering all of its rural settlements or growth to assist the viability of services that already exist there (unless such settlements offer little or no facilities), to ensure that opportunities for sustainable transport are maximised. The scale of such development however is likely to be smaller scale and should recognise the size, role and function of the settlement itself.

7.2 Settlements that offer key facilities such as primary schools, pubs, meeting places and a shop should be prioritised for growth – and where such facilities exist development should be allocated to support their continued viability and look to ways to enhance the services they offer. Settlements that have public transport links that already meet favourably with the requirements of PSP11 should also be prioritised for growth.

7.3 The green belt review, once initiated, should also look at how small discrete parcels of land could be released from this designation to achieve a pattern of sustainable development, support services and deliver affordable housing required to meet local needs – both those currently identified on the council's register and concealed needs given that many people will not be registered in areas that have not delivered any housing for significant periods of time.

7.4 We welcome the council's two-stage approach to these settlements, which seems to encourage local community engagement as the preferred route to preparing proposals for each community which is as it should be, but also outlines that if engagement is not forthcoming then 'plan led' growth will be investigated. This approach is applauded and must be continued because while Pathway 1 is an ideal solution, many communities are still resistant to growth, and in particular resistant to growth of a scale they think inappropriate, which in many cases is anything larger than a handful of houses. Some of the rural settlements in SGC offer a range of facilities and are suitable for higher levels of growth and it is therefore important that the plan led approach works with the community engagement aspect. In that regard it might be preferable for the plan to apportion growth to each settlement and the local communities left to decide how it is accommodated.

7.5 As the Phase 2 document rightly identifies also, national planning policy requires that 10% of a council's housing requirement should be delivered on sites that are 1ha or less in size. Smaller settlements are an ideal location of this scale of development and therefore a plan led approach is needed to ensure this form of supply is achieved.

7.6 In relation to the settlements that the phase 2 consultation identifies for further investigation we have no concerns with the settlements selected for further investigation. We also support the initial groupings being proposed and the scale of development suggested for each, although we would welcome further information in respect to how the settlements will be divided into these groups – i.e. what constitutes 'good' and 'some level' of access to key services and facilities.

7.7 Separate to these representations we have specific comments to make about the relative sustainability merits of certain settlements and how they should be ranked – please see our separate representations on this.

7.8 Having said this, we need to be pragmatic about the level of development that can be achieved in these areas. The Phase 2 document highlights that such development will '*meet identified local needs and rural communities making a contribution to meeting South Gloucestershire's overall needs'*. In terms of the latter, the contribution that these settlements will make towards SGC's wider needs will be limited and therefore the allocation of land in these areas should not distract the council for the pressing need to identify the most sustainable locations for larger scale strategic development. In our view this must involve the green belt land release of land adjacent to the urban boundary of Bristol, where existing job concentrations will minimise the need to travel for work, and where shops and services and other infrastructure are readily available without the need for the costly and uncertain infrastructure that would be needed to serve standalone settlements that are located in less sustainable locations.

7.9 Finally, in respect to the question posed on whether the existing suite of policies that apply to rural areas needs to be updated, we would suggest that a new policy is required in order to look flexibly at self-build plots in rural areas to help meet the Council's obligations under the Self-build and Custom Housebuilding Act 2015, given that a large proportion of demand for such plots are in rural settlements.

8.0 RENEWABLE ENERGY

8.1 We support the council's early examination of potential sites to accommodate standalone renewable energy development, which will play an important role in addressing the climate change emergency and reducing reliance on foreign imports of fossil fuels.

8.2 New specific sites will be important alongside larger scale national intervention such as offshore wind and more micro level schemes such as renewable energy generation on specific buildings. In terms of the latter the new Local Plan must continue to require new development to provide a proportion of their energy needs via on-site renewable energy generation – technologies that now combine solar PV and air source heat pumps for example are making the prospect of higher proportions of energy being generated in this way more economically viable.

8.3 Potential development sites that can provide the flexibility to deliver greater proportions of energy via renewable means should be prioritised for allocation over those who cannot, or will not commit, to more ambitious targets in this regard.

8.4 Separate to this, Nuclear Fusion also offers the potential promise of large-scale clean energy but this is as yet unproven and will take time. However we would support flexible policies being applied to allow facilities such as the Oldbury-on-Severn Power Plant to be reused to accommodate fusion as soon as it becomes practical and viable. The new Local Plan should include such a policy.

8.5 In response to the specific plan that has been prepared to set an area of search within which solar farms may be considered acceptable we agree with the work undertaken so far. Any future policy should be permissive to such development subject to certain design criteria, however it should not focus on solar development in this land at the expense of other forms of development because most of the land selected may be sustainable locations for residential and commercial developments – for example on the edge of Bristol's existing urban area – and the potential of delivering new development here should not be precluded by any policy relating to solar farms, given that they do not need to be sustainably located in respect of accessibility to jobs, services etc.

8.6 In relation to potential wind power we have no significant concerns with the potential safeguarding areas suggested on pages 208 and 209 of the Phase 2 Consultation Document as these seem to be well thought out and appropriate locations for such development.

9.0 GREEN INFRASTRUCTURE AND BIODIVERSITY

Strategic Green Infrastructure Network

9.1 We have reviewed the 9 Strategic Green Corridors that have been identified as part of the LUC Strategic Green Infrastructure Corridor Mapping Project and have no specific concerns with the corridors selected or their nature and characteristics identified. We do however question the utility of the work undertaken in respect to forming specific policies in the emerging plan.

9.2 The emerging policy position seems to accept that development may be possible within these corridors and that is essential in our view given their geographical extent. Furthermore, large parts of the corridors themselves offer little in the way of positive GI features that would contribute towards the aims and objectives that have been identified, such as wildlife corridor features, woodland etc. being land uses such as arable fields.

9.3 The document mentions that new development must maintain functional connectivity and provide new GI assets such as wildlife corridors open space etc. We suggest that current national and local planning policies require this in any event but are happy for that to be amplified in a new policy in due course. There is also the potential that new development sites can provide improved GI networks that expand the ones already identified and policies should be formulated for new allocations that allow this to be realised.

9.4 However, we would question why the Local Plan needs to define these areas, because they do not amplify any national protective polices in this regard and may also lead to a position where people think that these areas are to be treated differently to other parts of SGC – when in fact all new development and land use planning should be seeking to maximise biodiversity and GI networks. To identify assessed areas such as those set out may only confuse the plan and its users by diluting the message that all development should seek to take these opportunities. Furthermore, the designation of land in this way will make some plan users think that development in such areas is to be restricted.

9.5 In conclusion we do not consider that the 9 corridors presented should be identified in the new Local Plan. Instead, a broader policy that applies to all new development should be set out in the plan.

Biodiversity Net Gain

9.6 Connected to the above comments in the issue of Biodiversity Net Gain (BNG) which will soon be a statutory requirement that all new development must adhere to. We expect the

mandatory requirement to come into place in Winter 2023 due to the 2-year implementation period for mandatory BNG once the Environment Bill received Royal Assent and became the Act (which happened on 9 November 2021).

9.7 The headline requirement that all development sites must achieve a 10% improvement in terms of BNG is well known, however the full details of how this will be realised are not yet fully understood and it is widely acknowledged that in some cases, on-site BNG will not be possible. Therefore councils must formulate strategies and policies that allow the flexibility for both on-site and off-site solutions to BNG.

9.8 The emerging policy wording that deals with this issue set out at page 224 of the consultation document is reasonable with the exception of:

- The reference to the Strategic Green Infrastructure Corridors (requirement 1) – because as set out above we question the utility of including these areas in a plan and elevating the need to enhance connectivity of GI in these areas, above the wider needs of SGC; and
- In respect to criteria 7 we would add 'public' access to this requirement because many areas are publicly inaccessible and development can create such areas that are far more usable to the general public.

9.9 In respect to the WGC project that we have put forward, it is acknowledged that this is an existing golf course which forms part of greenspace, albeit privately owned and not fully publicly accessible. Accordingly, we want to make it clear that in respect to the above policy we do not consider that all existing recreational facilities should be protected at all costs. In the case of golf, our previous representations (please see the March 2021 representations for full details) in respect to this land has identified the following:

- The number of people playing the sport has reduced considerably over the last two decades – down from 889,100 people playing once a week in 2006 to 729,300 in 2016;
- There are a wide range of golf courses available in the area and not all of these are required given the dwindling participation levels; and
- These courses have the capacity to accommodate the small number of members, and casual players, that utilise Woodlands Golf Course and the relocation of these users would strengthen the other clubs' long-term viability.

9.10 Therefore, private golf clubs and other forms of recreation that are not publicly accessible should not be protected at all costs and while we note the above policy will be a development management policy in due course, its requirements should not be applied to the selection of new sites for allocation in the new plan. This process should be guided by the principles of

sustainable development, and in particular the need to minimise travel via non sustainable means.

9.11 Finally, in respect to the specific policy that refers to the detail of BNG (as set out on page 239) we agree that on-site BNG should be seen as the first priority, but there must be the flexibility to allow for off-site solutions to be advanced if required and we are fully supportive of the text that clarifies this. For example, we recently secured planning permission for a site in Bishop's Cleeve, Tewkesbury, which because of its previous use as allotments (now abandoned) and overgrown nature meant the land had a high baseline value, providing BNG would have precluded development of an otherwise highly sustainable site. To address this, we worked with the Gloucestershire Wildlife Trust to secure land elsewhere that they owned for improvement works to provide biodiversity net gain off-site for the residual amount we could not provide on the development itself (although a proportion of the gain was accommodated on-site also). Given the urban intensification of land being advocated in the emerging plans by SGC (which the need to provide BNG will not be exempt), this will be critically important as many brownfield sites will have to deliver BNG off-site.

9.12 SGC needs to allow the flexibility for such an approach to occur if required and allow developers to delivery well thought-out off-site solutions if necessary, or ideally SGC should look at coordinating offsite mitigation themselves, possibly in conjunction with the local wildlife trust. Therefore, we fully support the proposed BNG policy and supporting text that sets this out clearly, we commend the council for providing this flexibility and forward-thinking approach.

10.0 EVIDENCE BASE

10.1 We have reviewed the published evidence based of the Phase 2 consultation and have the following comments on this. As explained earlier we consider that an updated SHMA is also required as soon as possible to ensure the emerging plan is robust, as decisions on issues such as density need to be informed by this work.

Data and Access Profiles (DAPs)

10.2 Having examined the methodology paper alongside the DAP's themselves we acknowledge that they provide a useful source of data for a range of locations that may be considered suitable for accommodating housing growth.

10.3 However, in terms of determining where strategic scale growth should occur, they are of little utility because they primarily focus on smaller settlements or tightly defined existing urban areas where opportunities for such growth don't exist. For example the Bradley Stoke DAP might on first glance be useful to determine whether a urban extension in the locality, beyond the current urban areas boundaries might be preferable in sustainability terms, but in fact the data presented is misleading particularly in terms of self-containment and jobs to residents ratios because there are far more jobs within a walkable and cyclable distance of the boundary that that DAP considers – for example nearby Aztec West provides a scale of jobs that means the surrounding area has a ratio of jobs to residents well in excess of 1:1 meaning it would score highly in terms of strategic scale development in this locality providing a greater degree of self-containment.

10.4 The methodology paper sets out the following in respect to how the DAP Urban Areas were defined, stating:

As with rural areas, the 2011 Census data provides the most up-to date comprehensive source of small area statistics. The lowest geographical level at which census data is published is for Census Output Areas (COAs). The urban area DAPs boundaries have been aligned, where possible, with the COAs for ease of data analysis. However, as the COA's do not necessarily align with communities (especially new communities such as Lyde Green, which falls within the COA of Pucklechurch), the community profile areas for urban areas were taken from the Core Strategy evidence base, and then updated to ensure that they were still fit for purpose. The main change here was, as noted above, to include Lyde Green within the Emerson's Green profile area, and for Yate to be expanded to include the industrial units to the west. A similar calculation as for the rural areas, noted above, was then carried out for population and household estimates.

10.5 On this basis we would question why Bradley Stoke did not include the employment areas adjacent to it, which are within sustainable travel distances, to give a more accurate reflection of the data relating to available jobs and self-containment in the same way that the data has been finessed for Yate and then New Communities at Lyde Green and Emersons Green. Such an approach would also align with the way community, health and retail facilities are set out – with those within walking/cycling distance, beyond the defined output area, are shown.

10.6 This is not a significant criticism; it is just a request that officers and members look beyond this tightly defined data and provide professional judgment in gathering wider data sets against which to assess strategic scale proposals - once the SDS sets the spatial strategy on which to base their selection.

10.7 Therefore, we consider that the approach needs to be reconsidered slightly and the evidence base amended to include an assessment of all employment opportunities within walking/cycling distance considered to give a better understanding of the relative self-containment of these areas is, and their propensity to accommodate growth either within or adjacent to their boundaries without creating unsustainable patterns of commuting. This also needs to be consistent for all assessments for different locations.

Sustainability Appraisal Report

10.8 We note that the evidence base published with the Phase 2 consultation included an updated Sustainability appraisal prepared by LUC, dated February 2022.

10.9 As the phase 2 consultation is being undertaken on some very narrow issues, and in advance of the more detailed consultation on a plan that needs to be informed by the emerging WECA SDS, we do not have extensive comments to make on this document but would reiterate that the disjointed nature of the consultation, and the fact that the council are moving ahead with certain elements without the SDS to guide it, means that a proper analysis of how the SA process is being undertaken and whether it is working is hard to grapple with.

10.10 We would however like to make a few strategic points that need to be considered by the council now, otherwise we feel the council may be repeating many of the mistakes made as part of the preparing of the JSP.

10.11 Our first comment relates to table 3.1 which sets out 'key sustainability issues for South Gloucestershire'. It rightly identifies Climate Change as a key issue and sets out the opportunities that the Local Plan offers to address this as follows:

- *Increase the requirement for zero carbon, energy efficient building design and construction in new development, and support the retrofitting to decarbonise heating;*
- *Increase renewable and low carbon energy generation; and*
- *Minimise the need to travel and decarbonise travel where it is needed. Having declared a Climate Emergency within the authority, inclusion in the Local Plan helps strengthen the ability to reduce the impacts of climate change.*

10.12 While we support all three of these opportunities as key tools in addressing the climate change crisis the first two should be undertaken as a matter of course, irrespective of a development's location with SGC, because all developments should be able to positively address and emerging building regulations will enforce this in the short term. Simple development control policies can ensure that these opportunities are grasped.

10.13 The biggest opportunity for the Local Plan is the ability to provide a spatial strategy that maximises the final opportunity highlighted above – namely placing people and uses in a location where the need to travel can be minimised. As figure 8 illustrates transport makes up a significant proportion of CO2 emissions and therefore minimising these should be a priority, particularly given that sectors such as residential will be cutting emissions significantly over the coming years in line with emerging planning policy and building regulations, which means transport will have a larger proportional share over time as table C1 of the LUC SA report also clearly highlights.

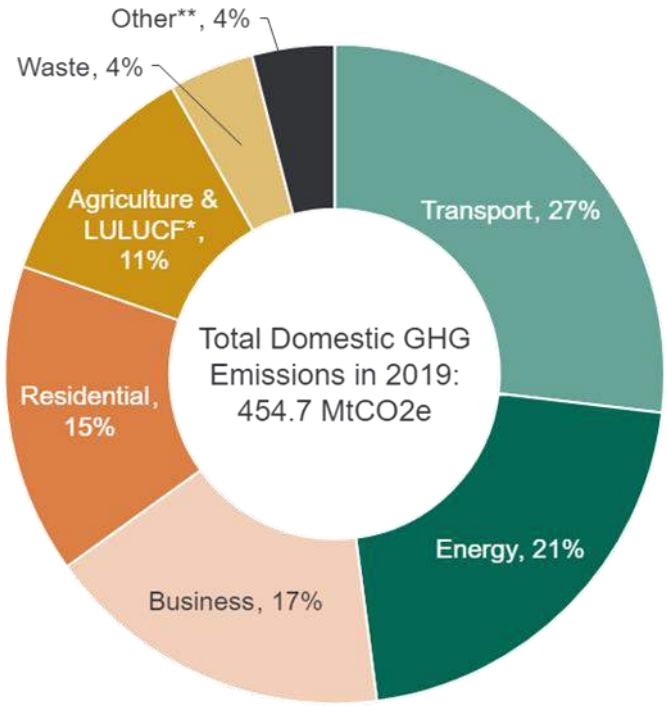


Figure 8. Greenhouse gas emissions by sector, 2019, by proportion (BEIS, 2020) (Source: DFT)

10.14 In our view the JSP did not successfully grapple with this key issue in its strategy which provided a significant amount of development to meet identified needs in a highly dispersed and peripheral spatial strategy (in fact the supporting documents to the JSP highlights there was no such clear spatial strategy because there had been no 'clear winner' identified as part of the SA process) which did not minimise the need to travel.

10.15 The new Local Plan offers a golden opportunity to look again on this issue and create a spatial strategy that really does meet climate change goals by locating significant strategic development in locations where it offers a genuine opportunity for new residents to minimise the need to travel by unsustainable means such as the private motor car, and where active travel and public transport modes can be maximised. This must mean adopting a strategy that locates housing where job opportunities already exist, and where recreational facilities exist so car trips can be replaced with more sustainable options.

10.16 The current SA looks at the urban intensification sites that are being considered and assesses them; we have no issue with this but would again highlight the need for a simple weighing system to allow sites to be better ranked in terms of how well they score against the selected criteria. We have raised this previously on a number of occasions and have shown how it would be easily remedied by scoring each site against the selected criteria with the following weighting being awarded:

Symbol	Effect	Proposed Weighting
++	Significant positive effect likely	2
+	Minor positive effect likely	1
-	Minor negative effect likely	-1
--	Significant negative effect likely	-2
0	Negligible effect likely	0
?	Likely effect uncertain	0

10.17 In respect to the '?' designation, the rating of 0 is considered appropriate given that effects are not known but it does highlight the need for the council to undertake assessment work to essentially '*fill in the blanks*', or consider the technical evidence that has been submitted to them by site promoters, landowners and other bodies as part of previous stages of representations – for example the voluminous technical work that supports the WGC proposals.

10.18 This weighting will provide a more understandable ranking system for respondents to comprehend, which while not perfect will be better than the approach currently taken and allow for a more logical weighting of sites. This will become particularly important when the council assesses other opportunities for development, beyond the currently assessed urban intensification sites.

11.0 WOODLANDS GARDEN COMMUNITY

11.1 As we have set out in the introduction, we act on behalf of the promoters of the Woodlands Garden Community proposals. While we acknowledge that the current consultation is not a call for sites and submissions have already been made in respect to this site, we are mindful that officers and members will be currently considering potential site allocations that will be required to meet housing requirements once they are confirmed by the SDS.

11.2 In light of this we want to remind officers and members of the site's credentials as a highly sustainable location for new development. In doing this would direct you to our representations to the JSP and March 2021 representations made to your phase 1 document; additionally we also submitted the evidence base relating to the site to the October 2020 Call for Sites, so the council should be taking this evidence base fully into account. If you would like us to re-provide these for ease of reference then please let us know.

11.3 WGC offers a highly sustainable location for new development and a robust masterplan for the site identifies that it can accommodate circa 1,750 dwellings, a local centre, primary school, parks and recreation space. Development in this location can harness the site's existing excellent links with the urban area of Bristol; utilising committed and existing infrastructure, such as the Metrobus network, as well as being close to the local centre within Bradley Stoke, reinforcing their viability in the long-term in accordance with one of the stated aims of the emerging plan. In turn, this will reduce carbon emissions by placing residents in closer proximity to areas that provide employment, services and shopping facilities, thereby reduce travel times and journey lengths, and maximising opportunities for travel via means other than the private car.

11.4 The current concept master plan for the site is set out at appendix A to this document.

11.5 The site is extremely well located in respect to bus provision, including metrobus which will support these services and allow them to be improved, rather than requiring wholesale new infrastructure to be delivered in the way a free-standing settlement would. This is a key issue given the council's acknowledgement that the climate change emergency needs to be recognised and a pattern of development that minimises carbon emissions supported – as we have explained many times before WGC is an ideal development location to achieve those aims.

11.6 The site's location relative to the plethora of everyday services, other facilities and employment opportunities is clearly defined in the plan shown at figure 9. While it will also provide key everyday facilities on-site, such as a primary school, convenience shopping and

office hub space, it also lies within easy walking and cycling distance of a wide range of other facilities and most importantly in an area with a high concentration of jobs where the ability to commute to work via sustainable means other than the private car will be maximised.

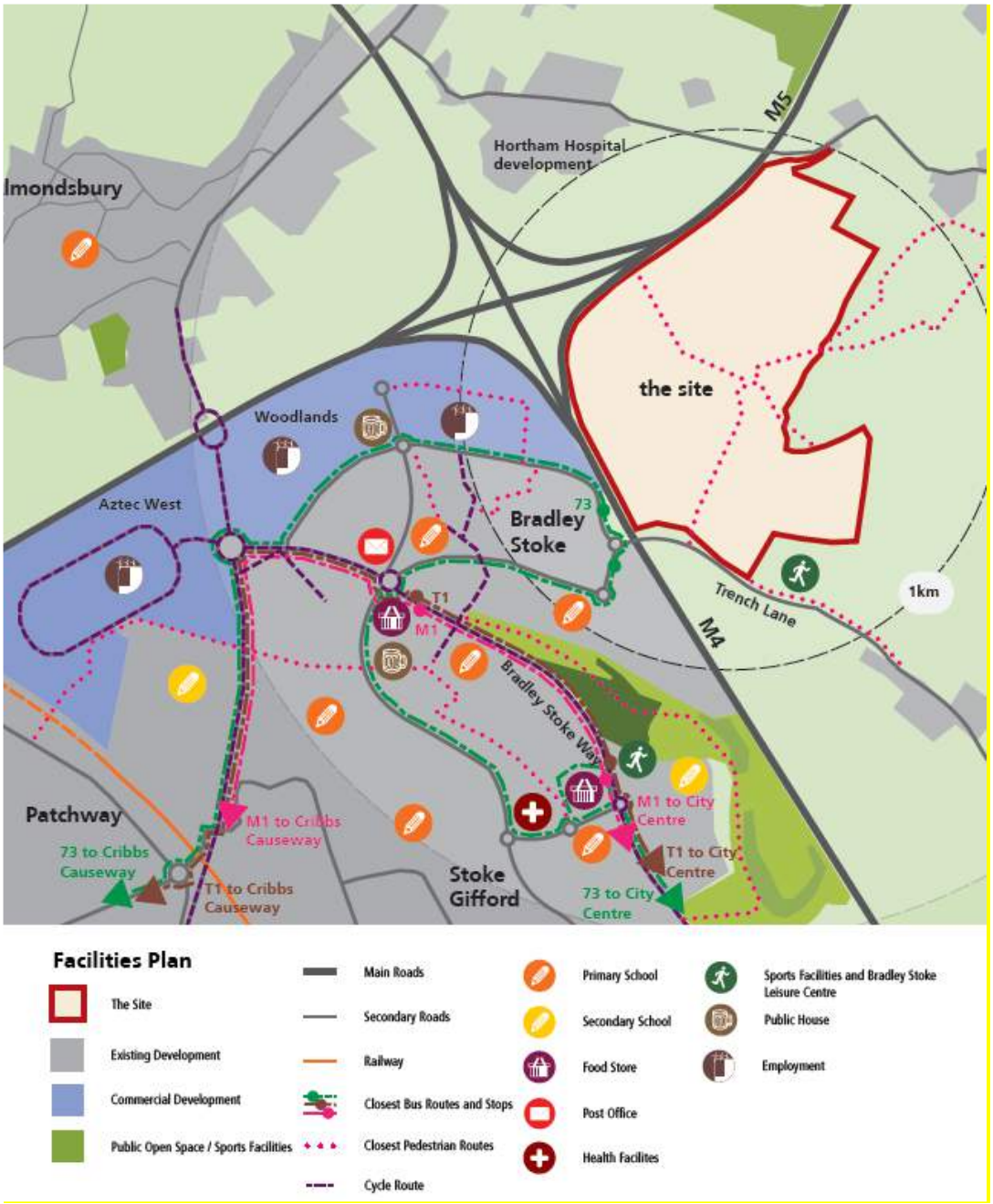


Figure 9. Location of the WGC Development

11.7 We recognise that politically there are concerns that development here might not be supported by the adjacent communities and we have therefore been very careful to engage with key stakeholders and members about the WGC proposals over the last 4-5 years.

11.8 This included discussions with Bradley Stoke Town Football Club who expressed a strong desire to utilise the sports pitches that the WGC development would deliver. As the council

have set out in the phase 2 document the delivery of pitches will be particularly problematic within the existing urban area and therefore sites that can deliver sufficient pitches should be looked upon favourably.

11.9 Initially feedback from council members was that the main concern about the site was related to the potential to overload junction 16 of the M5 and the associated nearby junctions serving Bradley Stoke and Aztec West. As a result an extensive traffic modelling exercise was undertaken to examine this issue in detail and this concluded that subject to some minor mitigation to junctions in the area no issues with highway network capacity could be identified – a formal report on the modelling work was submitted to SGC both as part of Call for Sites submissions and representations made to the JSP. No formal technical objection to this site on highways grounds has been raised since the submission of this information.

11.10 Following the completion of the highways work, and submission of other technical evidence including landscape assessment work, ecology surveys and drainage studies further JSP evidence base documents identified concerns regarding noise and air quality impacts on the site resulting from the M4/M5 Motorways. Accordingly, further technical work in the form of air quality and noise analysis was undertaken and supported further representations. While we have had no formal response to this work from the council, we are not aware of any residual concerns in respect to these issues, and nor would an objection to the sites development on either basis be sound based on then technical evidence available.

11.11 The latest discussions held with senior planning officers and members identified a final concern regarding the potential that because the site sat beyond the M4, there was no defensible planning or physical boundary to ensure that urban sprawl to the north of Bristol would not occur in the future if this site were to be allocated. We have explained that this is not the case because heritage assets further to the north of the site and a distinct ridgeline, along with a solar park to the east and motorway to the west, would prevent this.

11.12 Notwithstanding those barriers to further expansion, the site has been designed to have a generous landscape buffer to its eastern and northern edges. Additionally, as the council's phase 2 document sets out it is proposed that existing policy CS24 be updated to place a strong preference that POS be either offered to SGC or the relevant town or parish council. We propose that the POS associated with the WGC be offered to SGC, which will include the landscaped buffers around the site – thereby giving SGC full control to prevent further development to the north or east.

11.13 In conclusion we reiterate that the WGC project offers a highly sustainable location for development that can deliver a well-planned and highly energy efficient development, while also meeting affordable housing requirements in full.

12.0 CONCLUSIONS

12.1 While we have some concerns regarding the potential that proceeding with the Phase 2 assessment in advance of the SDS setting a robust and tested spatial strategy and housing requirement for the area, we acknowledge that it will ensure that the council maximizes its chances of delivering a plan in a timely manner.

12.2 We welcome the acknowledgement that SGC will plan for accommodating some of Bristol's unmet housing needs, this is a critical issue and one which SGC should positively embrace because a large part of the success of the city is as much down to SGC as it is to the Bristol City administration. The quantum of housing needs to be set as soon as possible to allow SGC to robustly plan for the future and we hope that WECA adheres to the anticipated timeframes and publishes a draft SDS this Spring to assist the council in its endeavours of moving toward the preparation of a robust Local Plan.

12.3 We also advocate the early identification of a requirement for new employment land, and as we have set out the 10ha figure that has currently been discussed should be seen as the bare minimum, with additional land being required to accommodate employment land lost to redevelopment in urban areas, to compensate for the imbalance of much of the land being in Severnside even though demand for employment land also exists elsewhere, and to accommodate smaller final mile distribution facilities, spoke and hub office space and other employment types that the council's own evidence base suggests are currently under provided for.

12.4 One of the key issues that we would draw attention to is while the principle of urban intensification is to be supported, and meets national planning policy and good planning principles, in areas where no significant large sites exist for specific allocation the council needs to be careful about how it accounts for the yields that these areas will contribute towards its housing requirements.

12.5 What it should not do is make large allowances for delivery from these areas which it then uses to suppress the need for greenfield sites, and in particular the release of Green Belt land that is sustainably located. This is because the council's own consultation document and interactive mapping clearly shows the scarcity of specific sites in these areas, and as we have set out, without commercial interest and specific call for site submissions to support, the redevelopment of areas such as retail car parks cannot be relied upon to deliver significant amounts of housing that can be considered deliverable in the context of the NPPF.

12.6 The redevelopment of such areas would already be supported by existing policies, yet large scale supply from these areas has not occurred even in the high demand economic context that currently applies. Therefore, there is insufficient evidence to allow the council to assume significant amounts of housing supply from the urban intensification areas chosen. Specifically identified sites that can be shown to be deliverable should be included but general supply from the rest of these areas is already reflected in a windfall allowance. Based on the council's consultation document it seems they will be included in a housing supply (see figure 1 of this document) and hence further allowances for these areas should not be included as it will represent double counting – because windfalls include the type of site that would be expected to unexpectedly come forward in the areas that have already been examined.

12.7 It is fine to formulate policies to support these windfalls and make sure the use of such sites is maximised but they cannot be relied on with any certainty, and the contributions they might make to the housing trajectory is covered by the windfall allowance

12.8 Issues relating to the densities of the areas being considered being too high have been highlighted and we would ask the council review that based on updated SHMA or other housing evidence because currently we do not consider that such high densities will deliver what the market needs – i.e. too many apartments and not enough family houses. We would also caution against the reduction in public open space requirements for urban areas, because it is here that open space plays an important role in wellbeing, recreation and community cohesion and while doorstop play and other measures may maximise the amount of POS available large reductions in playing pitch and other formal sports provision would be damaging to such communities.

12.9 Specific concerns and comments have been identified in respect to a small number of proposed allocation sites, although on the whole they are logical. Many of them would require compensatory employment land being provided elsewhere and two in particular are not considered deliverable without detailed noise assessment and master planning work to prove they can overcome the noise impacts of the adjacent motorway.

12.10 We have set out why we do not consider it appropriate that the Local Plan take forward the Strategic Green Corridors identified because they will add an unnecessary layer of complexity and dilute the message that all new development must enhance the GI networks both within the site and the surrounding area to contribute towards wider GI improvements across SGC as a whole.

12.11 We have also reiterated the credentials of the Woodlands Garden Community proposals which has previously been demonstrated as being a much more sustainable development

option when compared to the alternatives that have been previously considered as part of the JSP. This site remains available for development in a location where significant numbers of jobs, easy access to high quality public transport infrastructure and shops and services makes it highly sustainable. WGC can deliver up to 1,750 new sustainable homes with a high proportion of their energy needs met on site, a new local centre including shops, a primary school and other everyday facilities, a care village and new high quality sustainable access infrastructure – making a significant contribution towards housing supply at an early stage in the plan given the lack of extensive and costly infrastructure that is required to service it, this also means that there is no doubt about whether it can deliver policy compliant levels of affordable housing.

12.12 We hope the concerns we have identified are examined positively by the council and we look forward to the further opportunities to comment on the plan as it emerges after the SDS is published.

APPENDIX A
WOODLANDS GARDEN COMMUNITY MASTER PLAN



Masterplan Strategy

Access

1. Main access to the site from Trench Lane and from Gaunt's Earthcott Lane, creating a new strategic urban connection which is well enclosed by development.
2. Secondary or emergency access possible from Trench Lane
3. Public Right of Way (pedestrian route) within across the site retained within a green infrastructure (GI) corridor and serving to connect the existing and new communities towards strategic footpath networks to the north of the site.
4. New on-site pedestrian routes utitise existing shingle trails associated with the golf course and provide circular walks and leisure routes
5. A hierarchy of streets creates a legible residential environment. This includes main and secondary streets, shared surface areas and loops within development parcels, creating a highly accessible environment.
6. Buildings address POS with shared space / private drive frontage to promote quiet streets. All green spaces have frontages overlooking them to provide natural surveillance

1:1,2500

0 100 200m

Landscape

7. Joined up GI network including formal and informal recreation areas, childrens' play, allotments and ecological areas / SUDS. A number of circular walks are available within the GI network.
8. Historic filed boundaries, some still incorporating planting, have been retained to create additional green infrastructure corridors or avenues within the development with reference to local landscape character and ecological habitat/connectivity.
9. A dense landscape edge is proposed to the northern and eastern boundaries based on existing and enhanced planting. This boundary includes hedgerow planting with trees and a shared pedestrian/cycle path.
10. The built form to the northern site boundary redefines the urban edge. Existing hedge planting is proposed to be enhanced with trees, to help integrate development and allow filtered views into/out of the site.
11. Linear habitat creation is intended through the site, in association with the proposed road infrastructure/ drainage features/watercourse/retained hedgerows.
12. The potential to upgrade existing cycle and pedestrian infrastructure immediately adjacent to the site boundaries

Community

13. Two-form entry primary school close to development focus the centre of the site.
14. Potential Local Centre located centrally;
15. Public Open Space includes allotments as well as equipped childrens' play areas.
16. Proposed Commuter cycle route including on and off road sections within the development and providing a strategic connection to Bradley Stoke

client:
South West Strategic Developments

project:
Woodlands

drawing title:
Concept Masterplan

job number: **SWS103**
drawing number: **3207 draft**
scale: **1:2500 @ A1**
drawn: **jvs**
date: **October 2020**
status: **Preliminary**

urbandesignbox.co.uk

Copyright of Urban Design Box. This drawing is for illustrative purposes only and should not be used for any construction or estimation purposes. No liability or responsibility is accepted arising from reliance upon the information contained within this drawing. DO NOT SCALE DRAWINGS.

Urban Design Box

grassroots
PLANNING

Grass Roots Planning Ltd
Suites 9 & 10
Bristol North Baths
Gloucester Road
Bristol
BS7 8BN
t: 0117 930 0413 grassroots-planning.co.uk

Woodlands Garden Community

Regulation 18 Transport Submission

SWSD

Prepared by:

SLR Consulting Limited

3rd Floor, Brew House, Jacob Street, Tower Hill,
Bristol, BS2 0EQ

SLR Project No.: 416.065105/00001

15 February 2024

Revision: V03

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
V2	13 February 2024	TD	DR	DR
V3	15 February 2024	TD	DR	DR
	Click to enter a date.			
	Click to enter a date.			
	Click to enter a date.			

Basis of Report

This document has been prepared by SLR Consulting Limited (SLR) with reasonable skill, care and diligence, and taking account of the timescales and resources devoted to it by agreement with SWSD (the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

SLR shall not be liable for the use of or reliance on any information, advice, recommendations, and opinions in this document for any purpose by any person other than the Client. Reliance may be granted to a third party only in the event that SLR and the third party have executed a reliance agreement or collateral warranty.

Information reported herein may be based on the interpretation of public domain data collected by SLR, and/or information supplied by the Client and/or its other advisors and associates. These data have been accepted in good faith as being accurate and valid.

The copyright and intellectual property in all drawings, reports, specifications, bills of quantities, calculations and other information set out in this report remain vested in SLR unless the terms of appointment state otherwise.

This document may contain information of a specialised and/or highly technical nature and the Client is advised to seek clarification on any elements which may be unclear to it.

Information, advice, recommendations, and opinions in this document should only be relied upon in the context of the whole document and any documents referenced explicitly herein and should then only be used within the context of the appointment.

Table of Contents

1.0 Introduction 1
2.0 Local Plan 5
3.0 Existing Conditions 10
4.0 Changing Mobility Habits 31
5.0 Vision and Validate Approach 42
6.0 Access Strategy 55
7.0 Trip Generation and Assessment 59
8.0 Local Plan Stage 1 Modelling Outputs Reports 63
9.0 Summary 72

Tables in Text

Table 2.1: Preferred sites 5
Table 2.2: Lens 2 Sites 6
Table 3.1: Trench Lane traffic flows 13
Table 3.2: Hortham Lane traffic flows 14
Table 3.3: Local Facility Table 17
Table 3.4: Local Bus Service Summary 20
Table 3.5: Rail Summary Table 22
Table 4.1: Traffic Data A38 Aztec West 32
Table 4.2: Traffic Survey Data Comparison (2016 and 2024) 33
Table 4.3: SRN Traffic Flow Trends 34
Table 8.1: Lens 2 Impacts 65

Figures in Text

Figure 1.1: Woodlands Garden Community and Local Plan Context 2
Figure 2.1: Lens 2 Sites 7
Figure 2.2: Lens 2 Development Assumptions 8
Figure 3.1: Approximate Site Location Plan 11
Figure 3.2: Existing Trench Lane Access 12
Figure 3.3: Local Facilities Plan 15
Figure 3.4: Walking Isochrone Plan 15
Figure 3.5: Cycling Isochrone Plan 16
Figure 3.6 - TIER Area of Operation and Parking Locations 23

Figure 3.7 - Voi Bristol & South Gloucestershire Mode Shift Survey 24
Figure 3.8: Desire Line and existing Cycle Route to Aztec West 25
Figure 3.9: Existing Route to Bristol Parkway Railway Station 26
Figure 3.10 – Existing Route to Woodlands Business Centre 27
Figure 3.11: Existing Route to Cribbs Causeway 28
Figure 4.1: North of M4 Junction 20 (AM Peak Hour 0800 to 0900) 35
Figure 4.2: North of M4 Junction 20 (PM Peak Hour 1700 to 1800) 35
Figure 4.3: Commute Wellbeing 37
Figure 4.4: Internet Access By Age Group 38
Figure 4.5: South Gloucestershire EV Charging Points Installed 40
Figure 5.1: Access Hierarchy 43
Figure 5.2: SGC Transport Hierarchy 44
Figure 5.3: Local Living (15 Minute Neighbourhood Approach) 47
Figure 5.4: Primary Mobility Hub Illustration 49
Figure 5.5: Active Travel Strategy 51
Figure 5.6: Existing Bus Route (T1) 52
Figure 5.7: Potential Bus Service Arrangement (T1 Altered Frequency & New Route) 53
Figure 6.1: Active Travel Strategy 57
Figure 6.2: SUSTRANS Proposed Improvement Strategy 58
Figure 7.1: 2018 VISSIM Model Network 60
Figure 8.1: Lens 2 Sites 64
Figure 8.2: Lens 2 Development Assumptions 64
Figure 8.3: Lens 2 Impact on Traffic Flows (AM) 66
Figure 8.4: Lens 2 Impact on Traffic Flows (PM) 67
Figure 8.5: AM Delay (Lens 2 v DM) 68
Figure 8.6: PM Delay (Lens 2 v DM) 69

Appendices

Appendix A Illustrative Masterplan

Appendix B Access Design Drawings

1.0 Introduction

1.1 Background

1.2 SLR Consulting Limited has been appointed by SWSD to provide Transport Planning advice with regards to the promotion of the Woodlands Garden Community site through the South Gloucestershire Council (SGC) new Local Plan (2040). An illustrative masterplan is provided at **Appendix A.**

1.3 The site (allocation Code: EPS-FC14) is identified within the *New Local Plan Phase 3 Towards a preferred strategy (Consultation document 2023)* for a residential development including a primary school and local centre. The Emerging Preferred Strategy suggests that the site could deliver 800 homes in the plan period and a further 950 dwellings beyond the plan period, bringing the total to 1,750 homes. Two adjacent sites (EPS-SV5 and EPS-SV7) to Woodlands Garden Community are also included in the Emerging Preferred Strategy but these will deliver up to 280 homes beyond the plan period.

1.4 For clarity this document promotes site EPS-FC14 only (1,750 dwellings total).

1.5 As part of the analysis work included within the *New Local Plan Phase 3 Towards a preferred strategy (Consultation document 2023), '*3 Lenses' are considered (L1: Local Plan with no Green Belt Loss, L2: Local Plan Urban Edge, L3: Majority of new homes provided along already established key public transport routes and hubs).

1.6 The Woodlands Garden Community site is included as part of the Lens 2 assessment, and the development assumption is different to that identified in the Emerging Preferred Strategy.

1.7 As set out within the *New Local Plan Phase 3 Towards a preferred strategy (Consultation document 2023)*, the Woodlands Garden Community site is allocated for delivery of 800 dwellings during Plan period and 950 houses beyond the plan period. In respect of the two adjacent sites, these are not anticipated to deliver any housing during the plan period.

1.8 The Lens 2 assessment shows the Woodlands Garden Community site (Site L2-FC2) delivering 875 homes in the plan period and 880 homes beyond the plan period, with the two adjoining sites (Site L2-SV2 and L2-SV3) delivering 295 dwellings in the plan period. The location of sites LS-FC2, L2-SV2 and L2-SV3 are shown in **Figure 1.1** for context.

1.9 As the Preferred Strategy does not identify the two adjacent sites for delivery in the plan period, we are of the view that the Lens 2 assessment of a total of 1,170 dwellings (at Woodlands Garden Community and the two adjacent sites) should and can be delivered at Woodlands Garden Community in the plan period.

Figure 1.1: Woodlands Garden Community and Local Plan Context



1.10 The focus of this report is therefore linked to the Lens 2 assessment and the associated strategy.

1.11 Phase 3 of the local plan states that:

> *When making choices about where homes and jobs should be located, the emerging preferred strategy has, where possible, been influenced by the following principles:*
>
> - *Locate homes and jobs in places that reduce the likelihood of long travel commutes.*
> - *Locate homes and jobs in places where active travel connections already exist, can readily be enhanced, or new connections can be delivered and provide an attractive alternative to private car travel.*

- *Locate homes and jobs in locations that are on existing public transport routes or could be capable of delivering high-quality, viable and reliable public transport services in future.*
- *Locate homes and jobs in places that avoid, where possible, a high reliance on private car-based travel or costly infrastructure packages that are unlikely to be delivered in the plan period.*

1.12 This report takes into account the above requirements.

Context – 2018 Transport Study

1.13 This Transport Report should be read in conjunction with the Transport Study dated January 2018 that was prepared for the promotion of the site as part of the now withdrawn Joint Spatial Plan (JSP).

1.14 The 2018 study considered the transport impact of a development comprising 2,000 dwellings, a 2 Form Entry Primary School, Retail Provision and Local Centre and Care Home.

1.15 The access strategy comprised a vehicle access onto Trench Lane (primary access) and Hortham Lane. The access proposal for Trench Lane remains the same. The Hortham Lane access has been amended to a priority-controlled T-junction and shifted to the west.

1.16 A new active travel link via a new bridge over the M4 parallel to the Trench Lane bridge will be delivered. This would provide a segregated and direct pedestrian and cycle link between the site and Woodlands Lane. This remains unchanged.

1.17 Details of the vehicle access designs, and active travel bridge is provided at **Appendix B**.

Scope

1.18 A meeting was held with SGC planning and highway team on 21 November 2023 to discuss the Local Plan. A separate transport meeting was held with SGC transport team on Tuesday 16 January 2024. This included the Transport Policy Officer, Highways Development Control, and the Travel Plan officer.

1.19 A meeting was held between First Bus and SLR on 26 January 2024. First Bus suggested that there is potential for the T1 service to be diverted through the site whilst also still serving its existing route. This is subject to further assessment with the details set out later in this report.

1.20 SGC Transport Team presented the work undertaken to date on the Local Plan in terms of modelling and transport impact. Whilst at this stage it is unclear the extent of additional mitigation that is needed, SWSD's objective is to work collaboratively with SGC to identify

the exact need for improvements and desired mitigation measures and how these could be addressed or contributed to by Woodlands Garden Community.

1.21 Network operational enhancements can be delivered in many different ways, in particular through reduction in the demand for travel at congested time. This can be delivered through the following measures which would form the basis of the transport strategy for Woodlands Garden Community which are discussed in **Chapter 5**:

- Trip Containment – provision of onsite facilities;
- Masterplanning for people and places and not cars; and
- Mode shift from car to sustainable modes.

1.22 The vision for the scheme would be to implement sustainable transport measures to encourage a higher proportion of trips by sustainable modes. Only after the benefits of these have been realised should there be any consideration of capacity enhancements.

2.0 Local Plan

New Local Plan Phase 3 Towards a preferred strategy (Consultation Document 2023)

2.1 Section 5 Appendix 1 of the New Local Plan Phase 3 report, sets out a schedule of preferred sites in the emerging preferred strategy. **Table 2.1** provides a summary of the Woodlands Garden Community allocation (EPS-FC14) as well as the two adjacent sites (EPS-SV5 and EPS-SV7).

2.2 SWSD interests lies with site EPS-FC14 only. This document is for the promotion of site EPS-FC14 only.

Table 2.1: Preferred sites

Allocation Site	Address	Place	Proposed Use	Capacity for Homes in the Plan Period	Capacity for homes beyond the plan period
EPS-FC14	Woodlands Golf Course, Trench Lane, Almondsbury, (Woodlands Garden Community)	Woodlands	Residential, facilities including primary school and local centre	800	950
EPS-SV5	Land on the South Side of Gaunts Earthcott Lane	Woodlands	Residential	0	180
EPS-SV7	Land off Gaunts Earthcott Lane	Woodlands		0	100

2.3 As set out within the *New Local Plan Phase 3 Towards a preferred strategy (Consultation document 2023)* and as summarised in **Table 2.1**, the Woodlands Garden Community site is allocated for delivery of 800 dwellings during Plan period and 950 houses beyond the plan period. In respect of the two adjacent sites, these are not anticipated to deliver any housing during the plan period.

2.4 **Table 2.2** provides a summary of the Lens 2 assessment which assumes a different development schedule and strategy for the Woodlands Garden Community site and the two adjacent sites. It is the Lens 2 site assumptions that has been used to inform the initial modelling[1] work undertaken by SGC for the Local Plan

[1] Local Plan Stage 1 Modelling Output Report (2024)

Table 2.2: Lens 2 Sites

Reference	Address	Capacity for Homes in the Plan Period	Capacity for homes beyond the plan period
L2-FC2 (EPS-FC14)	Residential, facilities including primary school and local centre	875	880
L2-SV3 (EPS-SV5)		108	
L2-SV2 (EPS-SV7)		187	
Combined		1170	880

2.5 The *New Local Plan Phase 3 Towards a preferred strategy (Consultation document 2023)* states that the Woodlands Garden Community site could deliver 800 homes during the plan period, whilst the Lens 2 assessment assumed 875 homes in the plan period.

2.6 In respect of the two sites off Gaunts Earthcott Lane (EPS-SV5 and APS-SV7), the *New Local Plan Phase 3 Towards a preferred strategy (Consultation document 2023)* states that no dwellings will be delivered during the local plan period. However, the Lens 2 assessment states that two sites off Gaunts Earthcott Lane (L2-SV2 and L2-SV3) could deliver 108 (L2-SV3) and 187 (L2-SV2) dwellings respectively during the local plan period.

2.7 Notwithstanding the above, the two sites off Gaunts Earthcott Lane (EPS-SV5 and APS-SV7) are reliant on the Woodlands Garden Community site (L2-FC2 (EPS-FC14) coming forward first in order for the sites off Gaunts Earthcott Lane to be considered to be accessible. In the event that the two sites off Gaunts Earthcott Lane (L2-SV2 and L2-SV3) were to be delivered in isolation then access (vehicle and sustainable access) would be directly from Horetham Lane. There is no footpath provision for around 1km between the two sites off Gaunts Earthcott Lane and the built-up area of Hortham. A less direct route would be also needed to access facilities at Aztec West, Cribbs Causeway, and local rail stations. The travel distance to Aztec West from the two sites off Gaunts Earthcott Lane (L2-SV2 and L2-SV3) would be at least 750m longer than if those trips were routed through Woodlands Garden Community and which would connect to Woodlands Lane via a new active travel bridge over the M4.

2.8 Separate planning submissions make clear there is a reasonable prospect of a higher level of development on the SGC site within the plan period than the 800 currently envisioned, given the absence of significant infrastructure constraints in the area. As such we are of the view that the 1,170 dwellings identified for delivery in the Lens 2 assessment should all be included within the Woodlands Garden Community site, with houses delivered on the two sites off Gaunts Earthcott Lane to be delivered beyond the plan period or this land to be retained for landscaping purposes only.

Stage 1 Modelling Outputs Report

2.9 The SGC Stage 1 Modelling Outputs Report was published in January 2024, and forms an evidence base for the New Local Plan. The report presents the inputs considered for the development lenses and the respective model outcomes. Thet report is based on the West

of England Regional Transport Model (WERTM) suite consisting of Highway Assignment Model (HAM), Public Transport Assignment Model (PTAM) and Variable Demand Model (VDM) components to develop forecast year model scenarios for 2042 with SGC's local plan development changes.

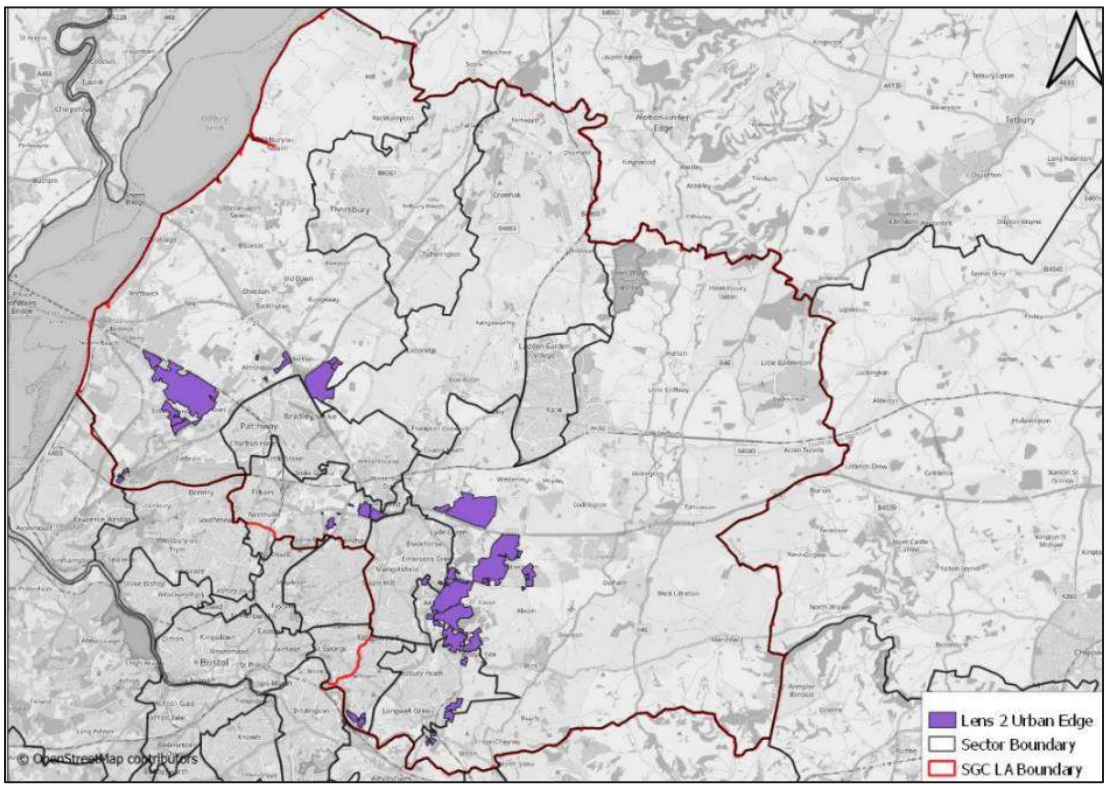
2.10 Three Do Something (DS) lenses have been tested at this stage and the impacts on the transport network, measured against the Do Minimum (DM) scenario. These are described below:

- **2042 Do Minimum**: this is the 2042 scenario with no Local Plan, but includes committed development and transport schemes which are assumed to have been completed by 2042;
- **2042 Do Something (Lens 1)** – Local Plan with no Green Belt Loss
- **2042 Do Something (Lens 2)** – Local Plan Urban Edge
- **2042 Do Something (Lens 3)** – Majority of new homes provided along already established key public transport routes and hubs

2.11 The relevant scenario for Woodlands Garden Community is the Lens 2 assessment.

2.12 **Figure 2.1** shows the location of the Lens 2 sites.

Figure 2.1: Lens 2 Sites



2.13 **Figure 2.2** provides a summary of the Housing and Job Numbers in Lens 2, which has been taken directly from the Stage 1 Modelling Outputs Report.

Figure 2.2: Lens 2 Development Assumptions

Sector	Dwellings	Jobs	% of Dwellings	% of Jobs
Kingswood	333	138	2.5%	1.0%
Pilning, Severn Beach and Woodhouse Down	3,747	2,956	28.5%	22.2%
Filton, Bristol Parkway & Frenchay	794	999	6.0%	7.5%
Iron Acton & Charfield	114	48	0.9%	0.4%
Pucklechurch & Chipping Sodbury	7,096	7,586	53.9%	56.9%
Mangotsfield	64	27	0.5%	0.2%
Longwell Green	1,018	1,572	7.7%	11.8%
SGC Total	**13,166**	**13,326**	**100%**	**100%**

2.14 The Lens 2 assessment comprises of 13,166 new dwellings and 13,326 new employment opportunities. The Lens 2 assessment does not account for any associated transport enhancements to mitigate the impact of the Local Plan.

2.15 It is not clear from **Figures 2.1** and **2.2**, where the Woodlands allocation is accounted for within the Lens 2 assumptions. SGC confirmed in a meeting on 16 January 2024, that the modelling includes 1,170 homes, a primary school and local centre for Woodlands. The modelling assumed that there is an access onto Trench Lane and Hortham Lane, but it does not assume a link road connecting Trench Lane and Hortham Lane.

2.16 At the current stage of the Local Plan, and whilst good progress has been made, the analysis and transport modelling work has not evolved to a point that identifies transport enhancements / mitigation.

2.17 The local plan appears to acknowledge this, with the Phase 3 report (para 5.52) stating that:

However further work will be required from the site promoters to demonstrate how development here could deliver, enhance, and achieve connectivity for active travel modes, public transport and vehicles and minimise further pressure on the transport network. Our current understanding is that there is little extra capacity available particularly along the A38 at the M5 Motorway Junction 16 and therefore a solution would be required to accommodate the proposed number of new homes here.

2.18 We would welcome engagement with SGC and other developers to further develop the sustainable access strategy so that the residual vehicle impact of the development can be agreed, and which can be used to inform a wider transport strategy to support growth.

2.19 A Transport Assessment scoping report has been issued to SGC and the scope of the modelling assessment work and trip generation are currently being developed and agreed with SGC.

3.0 Existing Conditions

3.1 This section outlines the existing transport conditions, local highway network, highway safety, walking and cycling opportunities, the facilities within easy walking & cycling distance, and public transport opportunities.

3.2 This section has been prepared with consideration of the requirements for developments as set out within Section 5.14 of the South Gloucestershire New Local Plan (December 2023 consultation version), and as replicated below:

- Locate homes and jobs in places that reduce the likelihood of long travel commutes.
- Locate homes and jobs in places where active travel connections already exist, can readily be enhanced, or new connections can be delivered and provide an attractive alternative to private car travel.
- Locate homes and jobs in locations that are on existing public transport routes or could be capable of delivering high-quality, viable and reliable public transport services in future.
- Locate homes and jobs in places that avoid, where possible, a high reliance on private car-based travel or costly infrastructure packages that are unlikely to be delivered in the plan period.

Site Location

3.3 The proposed development is located in the north of Bristol, nestled in the eastern quadrant of the M4/M5 junction. The site location is shown in **Figure 3.1**.

Figure 3.1: **Approximate Site Location Plan**



3.4 The site is bounded by Hortham Lane to the north, primarily farmland to the east, Trench Lane to the south, and the M4 and M5 to the west. The site is currently used as a golf course.

3.5 There is presently one point of access to the development site from Trench Lane to the south. This is a vehicular access which services the golf club; it currently takes the form of a simple priority junction which does not benefit from any pedestrian facilities.

3.6 **Figure 3.2** shows the existing access from Trench Lane.

Figure 3.2: Existing Trench Lane Access



Existing Site Use

3.7 The proposed scheme of Woodlands Garden Community site is located in the quadrant that is formed by the M4 and M5 motorway Almondsbury interchange (Junctions 20/15). **Figure 3.1** shows the location of the proposed development site.

3.8 The site is currently occupied by the following land uses:

- 2 x 18 Hole Golf Course;
- Fishing Lake;
- Conference and wedding facilities for up to 150 guests; and
- Clubhouse and bar.

3.9 The site benefits from approximately 140 car parking spaces as well as an overspill parking area. The site therefore has the capacity generate traffic under its existing use, which would need to be factored into the traffic impact assessment for the development.

Local Highway Network

3.10 Trench Lane is a single carriageway road which operates with two-way traffic flows and forms part of the adopted highway network. Trench Lane connects the B4427 to the east with Woodlands Lane to the west. The road is currently subject to a speed limit of 30mph in the vicinity of the site access, and increases to 40mph approximately 30m east of the site access. A traffic survey was undertaken in 2016 on this carriageway, and the resultant traffic

flows are shown below in **Table 3.1**. The use of 2016 data remains appropriate as traffic volumes in the vicinity of the site have been unchanged since 2016, as demonstrated later within **Chapter 4** of this report.

Table 3.1: Trench Lane traffic flows

Period	Westbound			Eastbound		
	Flow (vehicles)	Average Speed (mph)	85th %ile (mph)	Flow (vehicles)	Average Speed (mph)	85th %ile (mph)
AM Peak (0800-0900)	609	32	36	167	33	38
PM Peak (1700-1800)	188	34	39	500	34	38

3.11 As shown in **Table 3.1**, Trench Lane experiences tidal traffic, with the dominant flow being to the west in the AM peak period, and to the east in the PM peak period; this would be as expected due to the location of the employment in north Bristol. The west and east bound 85th percentile speeds in both the peak periods are below 40mph.

3.12 Once over the motorway to the west, Trench Lane is residential by nature with a speed limit of 30mph and street lighting and footpaths present, on both sides of the carriageway.

3.13 Trench Lane connects to Woodlands Lane via a roundabout junction. Woodlands Lane connects to Bradley Stoke Way via a signalised junction.

3.14 Trench Lane, south of the roundabout junction with Woodlands Lane, terminates at a four-arm roundabout, with Ormonds Close, Ellicks Close, and Bowsland Way. Ormonds Close and Ellicks Close are both residential areas. Bowsland Way connects with Bradley Stoke Way via a five-arm roundabout (Patchway Roundabout), with Pear Tree Road, and Brook Way.

3.15 Bradley Stoke Way is a residential road, which benefits from street lighting and a shared footpath/cycleway. Bradley Stoke Way terminates at the Aztec West Roundabout, with the A38 and Aztec West. The junction of the A38 and M5 is immediately to the north of this roundabout.

3.16 To the east, Trench Lane is subject to a 40mph speed limit, and operates with two-way flows.

3.17 To the north of the development site, Hortham Lane runs in an east-west direction. A traffic survey was undertaken on this carriageway in 2016, with the resultant traffic flows shown in **Table 3.2**. The use of 2016 data remains appropriate as traffic volumes in the vicinity of the site have been unchanged since 2016, as demonstrated in **Chapter 4** of this report.

Table 3.2: **Hortham Lane traffic flows**

Period	Westbound			Eastbound		
	Flow (vehicles)	Average Speed (mph)	85th %ile (mph)	Flow (vehicles)	Average Speed (mph)	85th %ile (mph)
AM peak (0800-0900)	120	44	51	52	47	56
PM Peak (1700-1800)	64	47	55	96	49	58

3.18 As shown in **Table 3.2**, the eastbound traffic has a slightly higher average recorded speed compared to that of the westbound traffic. Again, there is a tidal traffic flow, with the majority of vehicles traveling to the west (towards Bristol) in the AM period, and the majority traveling to the east (away from Bristol) in the PM period. However, traffic flows are low with less than 190 vehicle movements in both directions during peak hours.

3.19 Hortham Lane is a two-way single carriageway subject to the national speed limit, until Hortham Community, whereby it is subject to a 30mph speed limit. Hortham Lane connects to the A38 via a signalised junction.

3.20 To the east of Hortham Lane, Gaunt's Earthcott Lane is a single carriageway road, with passing places, and is subject to the national speed limit. Gaunt's Earthcott Lane terminates at a simple priority junction with Old Gloucester Road.

Pedestrian and Cycling

3.21 This section outlines the numerous facilities within easy walking and cycling distance of the proposed development. These facilities are graphically shown in **Figure 3.3**. Detailed Walking and Cycling Isochrone Plans are provided at **Figures 3.4** and **Figure 3.5** respectively which shows walking and cycling catchments based on walking routes rather than as the 'crow flies'

3.22 There is currently footpath provision on Trench Lane over the M4, and there is space along Trench Lane within the verge to provide a footpath connection to the Woodlands Site. Cyclists are able to cycle along the Trench Lane carriageway.

The development proposals would include a new active travel link via a new bridge over the M4 to enhance pedestrian and cycle connections over the M4.

Figure 3.3: Local Facilities Plan

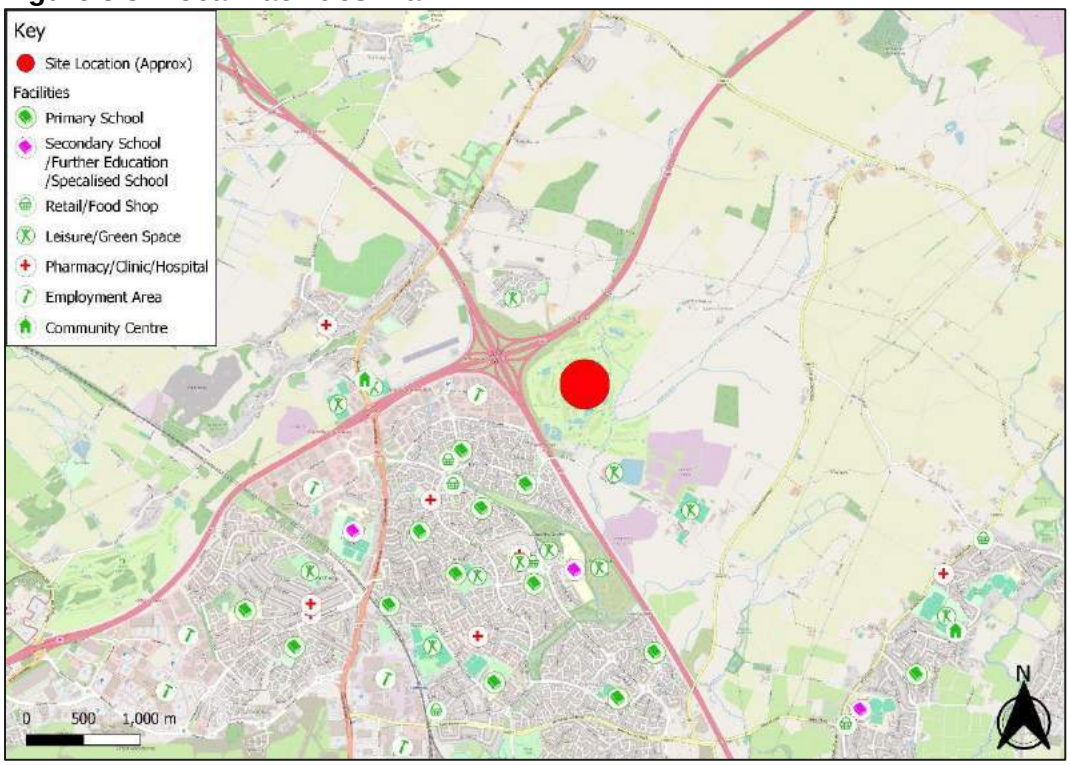
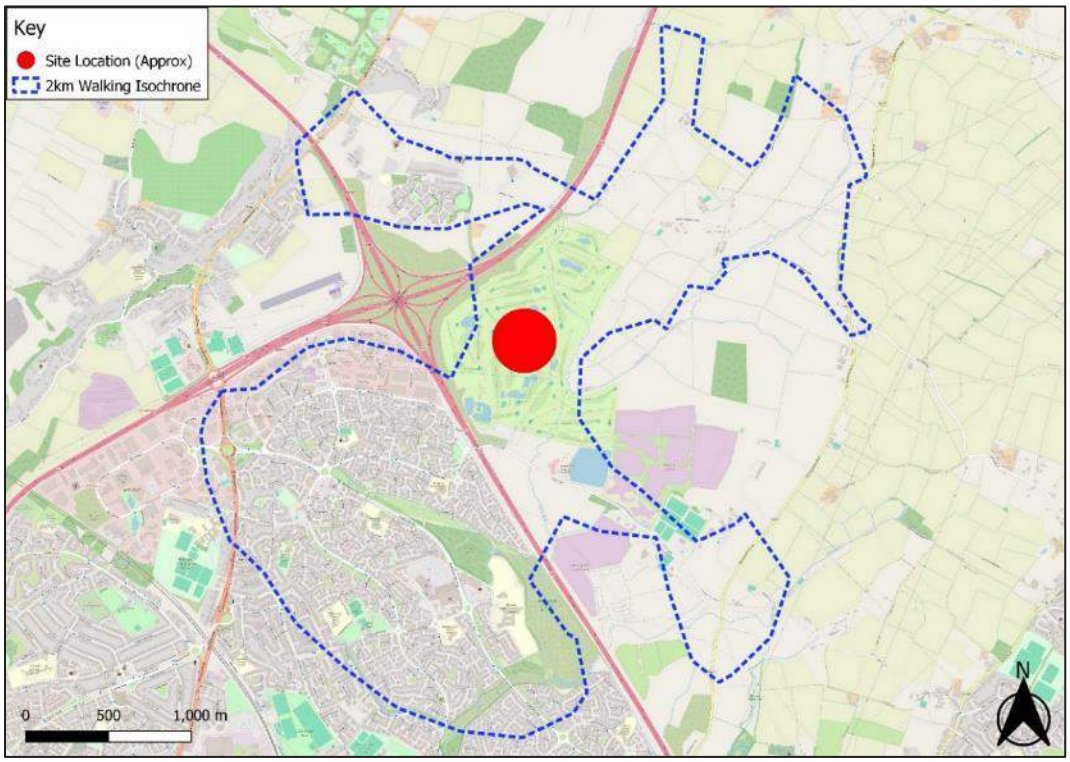


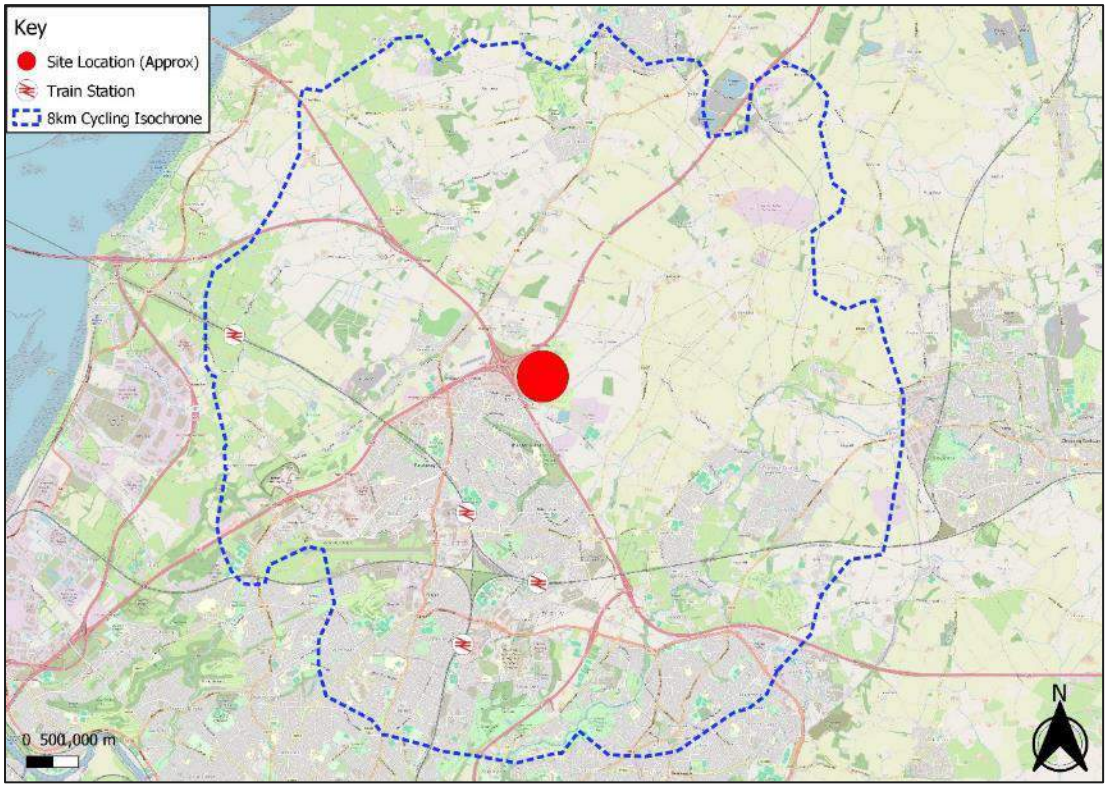
Figure 3.4: Walking Isochrone Plan



3.23 The walking isochrone shown at **Figure 3.4** includes two isochrones which use both site accesses as the starting point and are then combined to show a singular walking isochrone. Essentially, **Figure 3.4** demonstrates the locations that can be accessed within 2km of either access junction.

3.24 The isochrone takes account of the existing road and pedestrian network that is traversable on foot. For example, it does not show that pedestrians are able to walk along the adjacent motorway. The isochrone also does not account for links that do not exist, such as the proposed active travel link across the M4.

Figure 3.5: Cycling Isochrone Plan



3.25 The key local facilities that are accessible within appropriate walking or cycling distance from the centre of the site are outlined in **Table 3.3**, along with the walking and cycling journey times based on a reasonable walking speed of 1.4m/s and a cycling speed of 4.2m/s. This is not an exhaustive list and there are significant other facilities within walking and cycling distances.

Table 3.3: Local Facility Table

Facility \ Service	Name of Facility	Distance	Walking time (mins)	Cycling time (mins)
Primary School	On-Site	0	0	0
	Bowsland Green Primary School	650m	8	2
	Holy Trinity Primary School	1.2km	14	5
Secondary School	Bradley Stoke Community School	1.6km	19	6
	Patchway Community College	2.5km	30	9
Local Centre	On Site	0	0	0
	Pear Tree Road Local Centre	1.4km	17	5
GP	Bradley Stoke Surgery	1.6km	19	6
Dentist	Bradley Stoke Dental Centre	1.5km	18	6
Convenience Store	On Site	0	0	0
	Pear Tree Road Local Centre	1.4km	17	5
Supermarket	Aldi	1.5km	18	6
	Tesco	1.6km	19	6
Retail	Willow Brook Centre	1.5km	18	6
	Cribbs Causeway	5.0km	60	19
Leisure	Bradley Stoke Leisure Centre	1.6km	19	6
	North Bristol RFC	2.9km	35	11
	Almondsbury UWE FC	3.2km	38	12
Railway Station	Patchway	3.2km	38	12
	Bristol Parkway	4.3km	51	16
Post Office	Pear Tree Road Local Centre	1.4km	17	5
Library	Bradley Stoke Library	1.6km	19	6
Employment	Aztec West Business Park	2.4km	29	10
	Woodlands Business Park	1.1km	13	4

3.26 As shown in **Table 3.3**, there are a number of key facilities within easy walking and cycling distance of the proposed development. The location of these ensures the proposed development is inherently sustainable, as there is a tangible opportunity for a number of journeys to be made via sustainable means over the private car.

3.27 The location of the site in proximity to key local facilities accords with the requirement of the South Gloucestershire New Local Plan to “locate homes and jobs in places that avoid, where possible, a high reliance on private car-based travel or costly infrastructure packages that are unlikely to be delivered in the plan period” as car-based travel can be avoided by undertaking a number of day-to-day journeys on foot or by bicycle to the most local facilities.

3.28 The vast majority of facilities are located to the west of the proposed development, and require pedestrians and cyclists to cross Trench Lane over the M4.

3.29 Currently, there is limited pedestrian or cyclist facilities along Trench Lane over the M4. Cyclist would be able to cycle in the carriageway. However, whilst there are footpaths provided on either side of the Trench Lane bridge these are narrowed through the provision of safety barriers. There are also no formal footpaths along Trench Lane to the east of the existing bridge.

3.30 This will be addressed via the introduction of a pedestrian and cycle footbridge over the M4, details of which is provided at **Chapter 4** of this report.

3.31 Based on the local facilities presented in **Figure 3.2** and **Table 3.3**, and the walking and cycling isochrones, we envisage that the key pedestrian and cyclist desire lines will be between the site and the following locations:

- Aztec West;
- Bristol Parkway Railway Station;
- Willow Brook Retail and Bradely Stoke Leisure Centre (via route to Bristol Parkway Rail Station);
- Woodlands Business Park;
- Bristol City Centre; and
- Cribbs Causeway.

3.32 These locations will be key destinations for leisure, shopping, and commuting trips (both local and regional), and therefore will attract a high proportion of trips from the proposed development.

3.33 As part of the access strategy for the development, a full assessment of the routes to these locations will be provided, and where necessary, improvements will be proposed. Or alternatively it has been suggested by SGC that an active travel strategy could be developed as part of the local plan as mitigation for the wider housing growth it proposes, and the development at Woodlands Garden Community could provide funding towards these wider improvements.

3.34 Enhanced active travel provision will allow for the requirement of South Gloucestershire New Local Plan to “locate homes and jobs in places where active travel connections already exist, can readily be enhanced, or new connections can be delivered and provide an attractive alternative to private car travel” to be met.

3.35 This review will build upon the assessment undertaken by SUSTRANS to support the 2016 Transport Strategy.

3.36 A high-level summary of the routes is presented within this report following the assessment of public transport availability.

Public Transport

3.37 This section outlines the numerous public transport opportunities located within close proximity to the proposed development.

3.38 This section demonstrates that the site is situated within close proximity to existing public transport links, particularly buses, which accords with the requirement of South Gloucestershire New Local Plan to “locate homes and jobs in locations that are on existing public transport routes or could be capable of delivering high-quality, viable and reliable public transport services in future.”

Bus

3.39 The closest bus stop is presently located approximately 350m from the southern access, either on Trench Lane, or Woodlands Lane. The bus stops on Trench Lane benefit from shelters, bus timetable information, and street furniture, whilst the bus stops on Woodlands Lane benefit from a flag and pole arrangement.

3.40 Bus services 73 and CS7 call at these stops. The 73 service provide frequent services to Aztec West, Bradley Stoke, Filton, Bristol City Centre, Bristol Temple Meads, Knowle and Hengrove. The CS7 service is a school service operating once per day in each direction.

3.41 An additional local bus service, T1 Lynx, can be accessed via bus stops outside Bradley Stoke Leisure Centre on Bradley Stoke Way, within an approximate 1000m walk from the site access. The T1 service provides frequent services to the centre of Bristol via Bradley Stoke.

3.42 These services are summarised below in **Table 3.4**.

Table 3.4: Local Bus Service Summary

Service	Route	Direction	First/Last	Frequency (Each Direction)
73	Aztec West – Bradley Stoke – Filton – Bristol City Centre – Bristol Temple Meads – Knowle – Hengrove	Aztec West	0622/2350	2 per hour
		Hengrove	0606/2313	
CS7	Stoke Gifford – Almondsbury – Marlwood School – Thornbury	Stoke Gifford	1606	1 per day
		Thornbury	0752	
T1	Thornbury – Bradley Stoke – Bristol City Centre	Thornbury	0631/0001	3 per hour
		Bristol City Centre	0603/2351	

3.43 As shown in **Table 3.4**, the primary service is the number 73, which operates extended service hours, at a regular frequency, from within 400m of the site access. This is supported by the T1 Lynx service which operates frequently from bus stops within 1000m of the site access.

Demand Responsive Transport (WESTlink)

3.44 WESTlink is an on-demand minibus service that allows residents to book their bus journeys through an app, website, or phone. It forms part of the largest on-demand bus scheme in the UK. It aims to reconnect communities by offering people currently without a local service the opportunity to get back on the bus. WESTlink buses can provide collection from areas that do not have a physical bus stop, and therefore there is potential for future residents at the site to be able to access bus services from their doorstep.

3.45 The site sits within the Northern WESTlink area, and within this area mini-bus services provide on-demand local connections to key transport nodes within the area including Thornbury and Yate. Typically, WESTlink buses arrive within 5-45 minutes of booking[2], and a real-time map within the app can be used to identify the current location of the minibus.

3.46 At present, the WESTlink service is operational from 07:00 to 19:00 on weekdays and Saturdays. No WESTlink service is available on Sundays. Single fares are available for £2 for adults, and concessionary bus passes are accepted. Bookings and payments are able to be made online, on the WESTlink app, or by phone.

[2] https://n-somerset.gov.uk/my-services/parking-travel-roads/transport-travel/bus-travel/westlink

3.47 The WESTlink service provides the opportunity for future residents of the site to access locations which otherwise would only be accessible by car, considering the distances and lack of alternative options available.

Metrobus

3.48 The closest Metrobus stop is situated adjacent to Bradley Stoke Leisure Centre, within 1,000m of the site access by foot.

3.49 The use of a pedestrian link through Patchway Brook between Ellicks Close and Bradley Stoke Way means that you can walk to the metrobus bus stop within a distance of approximately 1km. The Metrobus stops benefit from digital timetable information, ticket machines, and bicycle parking stands to encourage sustainable multimodal travel. Whilst the stop is 1km from the site, infrastructure is in place to encourage those that chose to use the Metrobus to cycle to the stop. Metrobus services operate with a higher level of reliability compared to typical local bus services, with separate bus lanes and guided busways for parts of the journey allowing the services to avoid queuing traffic.

3.50 The M1 metrobus service operates from this location, and provides services between Cribbs Causeway and Hengrove Park approximately every 15 minutes. On the M1, Bristol City Centre is accessible within a 30-minute journey from Bradley Stoke Leisure Centre.

Rail

3.51 The two nearest railway stations to the proposed development are Patchway and Bristol Parkway, at 3.2km and 4.3km from the southern access point respectively. There are four cycle parking stands, providing space for 8 cycles, and 15 car parking spaces at Patchway, and 156 cycle parking spaces, and 1140 car parking spaces at Bristol Parkway; this enables multimodal sustainable travel. A number of locations can be accessed from Patchway and Bristol Parkway, as outlined in **Table 3.5**.

Table 3.5: Rail Summary Table

Originating Station	Destination	Duration	Frequency
Patchway	Bristol Temple Meads	13 minutes	Hourly
	Cardiff Central	48 minutes	Hourly
Bristol Parkway	Bristol Temple Meads	12 minutes	4 per hour
	Swindon	25 minutes	2 per hour
	Bath Spa	28 minutes	1 per hour
	Cardiff	40 minutes	2 per hour
	Taunton	45 minutes	1 per hour
	Reading	58 minutes	2 per hour
	Exeter St David's	1hr 12 minutes	1 per hour

3.52 As can be seen from **Table 3.5**, a wide range of locations can be accessed from the proposed development, within a reasonable commute time. It should be noted that only direct services have been shown, and that a number of destinations can be accessed more frequently if changes are made.

Micro-Mobility

TIER Scooters & E-bikes

3.53 In October 2024 TIER began to roll out a fleet of electric scooters and E-bikes across Bristol and South Gloucestershire. The site sits on the boundary of the area of operation, and scooter parking spaces are provided on Bradley Stoke Way approximately 1.5km from the site. The extent of the area of operation and location of closest hire points are shown at **Figure 3.6.**

Figure 3.6 - TIER Area of Operation and Parking Locations



3.54 There is potential to explore the extension of the area of operation with TIER, and to provide scooter and e-bike bays within the site.

3.55 TIER scooters and E-bikes are hired on a short-term or long-term basis through an app with prices starting from 99p unlock fee, and 16p a mile. A range of further passes are available.

3.56 Within the Bristol area there are approximately 100 parking bays, which allows for travel by e-scooter to a variety of locations across the region.

3.57 The presence of the e-scooter scheme has significant potential to influence the ways in which future residents travel

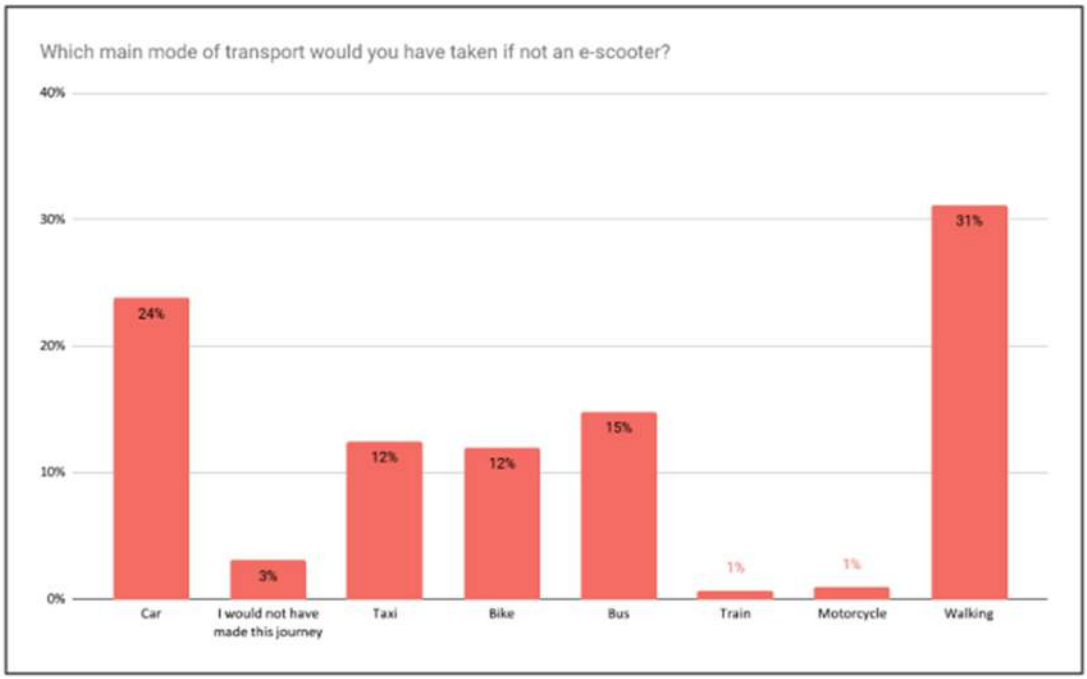
3.58 The e-scooter scheme in Bristol was previously operated by Voi. Following the initial 12-month trial in Bristol & Bath, the West of England Combined Authority (WECA) published a review together with Voi outlining the findings and impacts of the trial[3].

3.59 It was reported that in Bristol, 36% of e-scooter users would have instead made the trip by car or taxi. This is shown at **Figure 3.7**. Voi estimated that in Bristol and South

[3] https://travelwest.info/app/uploads/2022/04/WECA-x-Voi-escooter-trial-12-Month-Report.pdf

Gloucestershire alone 874,000 trips had been replaced by an e-scooter within the first 12 months of the trial alone.

Figure 3.7 - Voi Bristol & South Gloucestershire Mode Shift Survey



Key Desire Lines

3.60 As aforementioned, the key desire lines are expected to be between the site and the following locations:

- Aztec West;
- Bristol Parkway Railway Station;
- Willow Brook Retail and Bradely Stoke Leisure Centre (via route to Bristol Parkway Rail Station);
- Woodlands Business Park;
- Bristol City Centre; and
- Cribbs Causeway.

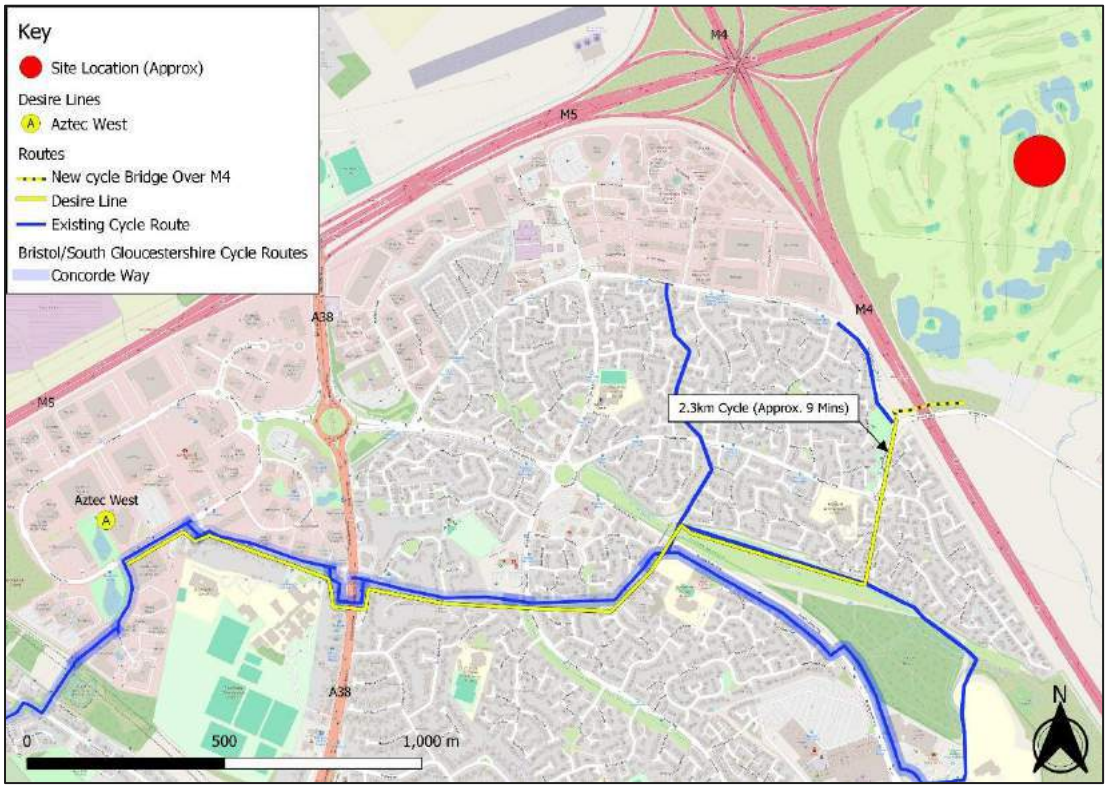
3.61 This section provides a summary of the existing accessibility to these locations. A full review will be contained within a supporting Transport Assessment.

Aztec West

3.62 Aztec West is a large employment site, which is likely to be the workplace of a significant number of residents living at Woodlands. Aztec West is located approximately 2.4km walk/cycle from the site (from the proposed location of the pedestrian/cyclist overbridge), which equates to a walking journey time of 29 minutes based on a typical walking speed of 1.4m/s, or a cycling journey time of 10 minutes based on typical cycling speeds of 4.2m/s.

3.63 **Figure 3.8** presents the expected journey route for pedestrians and cyclists.

Figure 3.8: Desire Line and existing Cycle Route to Aztec West



3.64 Pedestrian footways are provided adjacent to all roads on this route, and cyclists are required to cycle on-road. Alternatively, the existing 73 bus service, which serves stops adjacent to the site on Trench Lane, can be used to access Aztec West within a journey time of approximately 14 minutes. The 73 service operates at a frequency of once every 30-minutes.

Bristol Parkway Railway Station and Willow Brook Retail Park

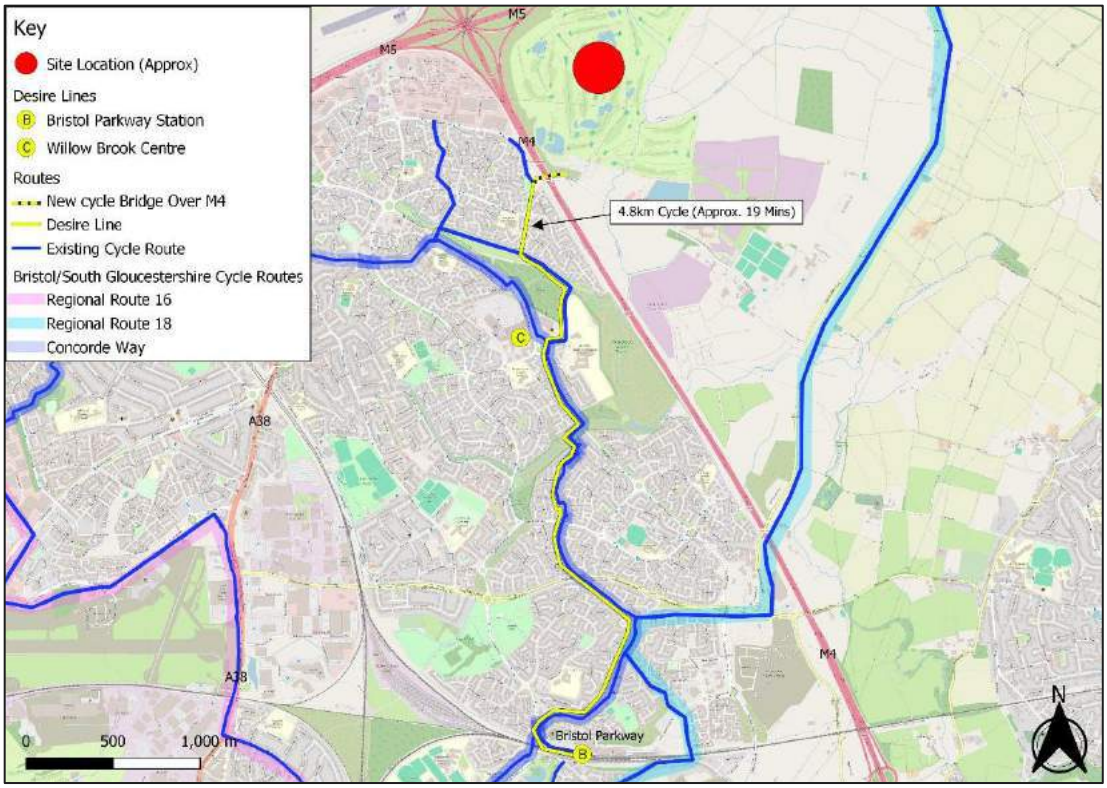
3.65 Bristol Parkway Railway Station is a key commuter hub, situated approximately 4.4km by bicycle from the proposed pedestrian/cycle access on Trench Lane. This equates to a cycling journey time of approximately 17 minutes based on a typical cycling speed of 4.2m/s.

Bristol Parkway provides frequent services to a plethora of destinations including London, Cardiff, Bristol, and Manchester and is therefore expected to attract a number of trips from the proposed development.

3.66 Willow Brook Retail Park is expected to be a key destination for residents for the retail offering available, with a number of chain stores provided. The retail park is also supplemented by Bradley Stoke Leisure Centre. The retail park is situated 1km from the site access and this is accessible within a journey of 12 minutes on foot, or 4 minutes by bicycle. Willow Brook Retail Park is situated along the route that cyclists would take to access Bristol Parkway Railway Station and therefore the two destinations have been considered in the same analysis.

3.67 **Figure 3.9** shows the expected journey route for cyclists.

Figure 3.9: Existing Route to Bristol Parkway Railway Station



3.68 The majority of the route between the site and Bristol Parkway can be undertaken off-road, along Patchway Brook and Stoke Brook. The areas in which on-road cycling is required is typically within residential areas with low-speed limits and volumes.

3.69 With the exception of the section of route to be provided as part of the development along Trench Lane, Willow Brook Retail Park is accessible entirely through the existing cycle network.

3.70 Alternatively, the 73-bus service which serves stops on Trench Lane can be used for access to Bristol Parkway with a journey time of approximately 17 minutes, and a frequency of once every 30-minutes.

3.71 The site is also located within 3.2km walk / cycle distance from Patchway station which provides a good level of service but slightly reduced when compared to Bristol Parkway.

Woodlands Business Centre

3.72 Woodlands Business Centre is a local employment area situated to the north west of the development. It can be accessed within approximately 1000m from the active travel access point. This equates to a journey time of 12 minutes for pedestrians and 4 minutes for cyclists.

3.73 **Figure 3.10** presents the expected walking and cycling route from the site access to Woodlands Business Centre.

Figure 3.10 – Existing Route to Woodlands Business Centre



3.74 There is currently a pedestrian footway on both sides of Woodlands Road for the entire route between the site access and Woodlands Business Centre. The traffic flows are low, as demonstrated by traffic surveys undertaken, which is conducive to cyclists and vehicles operating simultaneously safely.

Bristol City Centre

3.75 Bristol City Centre is a large employment area, and is also likely to attract a number of shopping and leisure trips from the development.

3.76 The cycling distance between the site and Bristol City Centre is approximately 13km and therefore the propensity for residents to walk or cycle this route is limited.

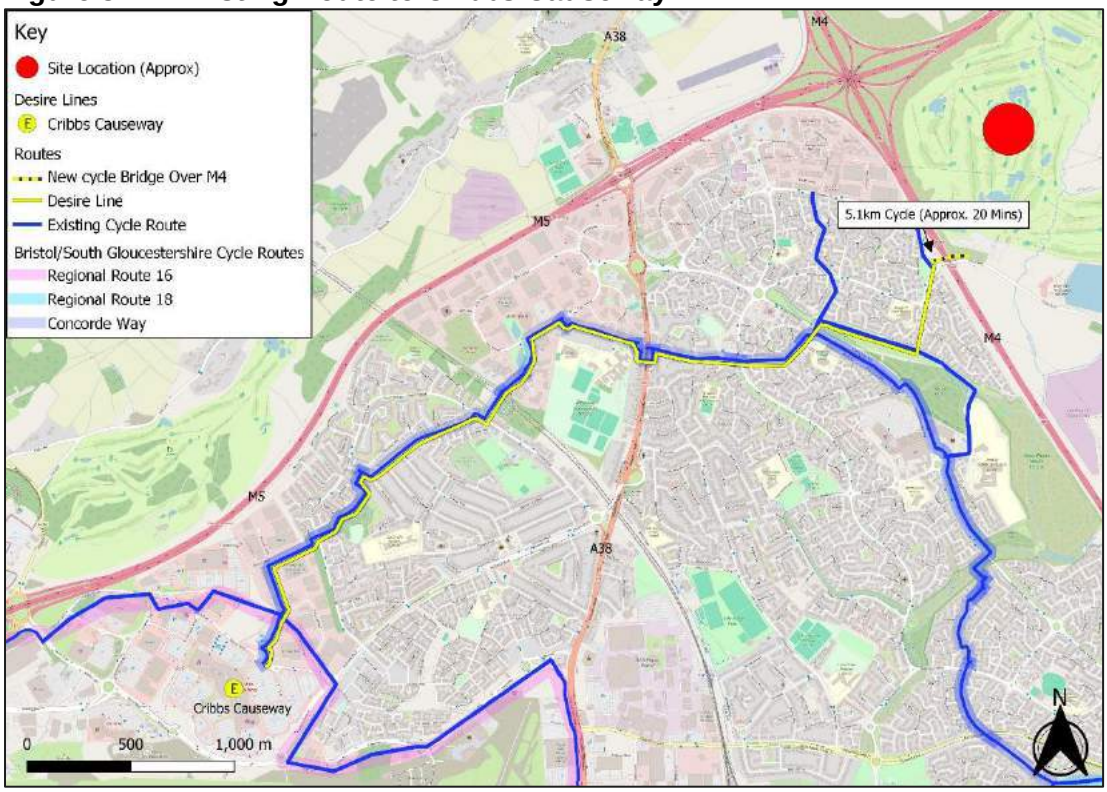
3.77 The public transport offering between these locations is of good quality, with the T1 Lynx, or M1 Metrobus service providing access between Bradley Stoke Leisure Centre (accessible within a 12-minute walk) and Bristol City Centre within approximately 20 minutes. Services are available from Bradley Stoke Leisure Centre every 10 minutes.

Cribbs Causeway

3.78 Cribbs Causeway is situated within a 5.2km cycle from the development. This equates to a journey time of 21 minutes assuming a reasonable cycling speed of 4.2m/s. It is expected that a considerable number of shopping, leisure and some employment trips will be made to this location.

3.79 **Figure 3.11** presents the expected cycling route from the site access to Cribbs Causeway.

Figure 3.11: Existing Route to Cribbs Causeway



3.80 A significant proportion of the route between the proposed development and Cribbs Causeway follows sections of road which benefit from off-road cyclist provisions such as shared footway/cycleway. This is conducive to cyclist movements.

3.81 Alternatively, the M1 metrobus service, which serves the bus stops adjacent to Bradley Stoke Leisure Centre (approximately 1km from the site access) can be used for access to Cribbs Causeway with a journey time of 13 minutes by bus.

Access to Employment

3.82 The 2018 Transport Study provided an assessment determining how many jobs were available within a distance of 2km, 5km, or 8km, which are distances that are considered suitable for walking or cycling.

3.83 The study overlaid the respective isochrones onto ward boundaries and used 2011 census data to determine the number of workers, and therefore jobs, that were present in each ward. Where only part of a ward was covered, the number of jobs was adjusted appropriately.

3.84 Updated census data for 2021 is available, however due to the COVID-19 restrictions being in place during the data collection phase, it is likely that the number of workers (and therefore jobs) in each ward will be under-represented as many workers would have likely been working temporarily from home, or had been furloughed.

3.85 Based on this, it is considered appropriate that the use of 2011 census data is continued, however it should be caveated that significant economic growth has occurred in Bristol since 2011 and therefore additional jobs will be available within appropriate cycling distance from the site. The data presented is considered therefore to be a worst-case scenario.

3.86 **Table 3.6** summarises the number of existing jobs accessible from Woodlands on foot and by bike. This is based on 2011 employment numbers and does not account for any additional development that was due to be delivered through the now withdrawn Joint Spatial Plan or the current Local Plan provision.

Table 3.6 – Jobs Available from Woodlands

25-Minute Walk	19-Minute Cycle	30-Minute Cycle
2km	**5km**	**8km**
4,833 jobs	25,823 jobs	61,452 jobs

3.87 The proximity of Woodlands to a significant number of jobs accessible by foot or by bicycle accords with the requirement within South Gloucestershire New Local Plan to “locate homes and jobs in places that reduce the likelihood of long travel commutes”.

Summary

3.88 This section of the report confirms that the site is located in a highly accessible location and is suitably located to provide the opportunity to encourage trips by sustainable modes. The site is located within active travel distances of key area including Aztec West, Cribbs Causeway, UWE, Filton, and Bristol Parkway Rail Station which provide significant employment retail, education, health, and leisure facilities. Future residents could make use of the existing walking and cycling infrastructure that can be used to access these areas.

3.89 Bus routes are located nearby which provides connections to the areas identified above as well as Bristol City Centre.

3.90 Bristol Parkway rail station is located within a comfortable cycle ride from the site which provides frequent services to Bristol, Cardiff, Reading, and London.

3.91 The following key areas of enhancement should be considered further:

- Provision of Active Travel Bridge between the site and Woodlands Lane to the west;
- Provision of an Active Travel Link connecting the Trench Lane Roundabout with off-site cycle links (including Concorde Way);
- Review of existing off site cycle links and potential enhancements to these links;
- Enhance cycle parking facilities at the Metrobus stops on Bradley Stoke Way;
- Provision of additional cycle parking at Patchway Rail Station;
- Liaison with bus operators to potentially route bus services through the site.

4.0 Changing Mobility Habits

Introduction to Changing Mobility Habits

4.1 There is demonstrable evidence to suggest that modern attitudes towards travel and the intergenerational effect and attitudes toward movement are changing rapidly, and that transport policy is seeking to keep abreast of these.

4.2 This change in attitude towards travel and mobility has been facilitated by a number of factors including the rapid growth in smart phones with internet access, combined with location services enabling users to access, order and pay for transport services in an integrated way, as well as the recent Covid-19 pandemic and a renewed desire for local living.

4.3 Car use has been considered the dominant travel mode in the UK for decades, and this has led to a Predict and Provide (P&P) approach to development planning. P&P involves predicting a demand (usually car) and trying to make it fit on the existing road network; where it didn't fit, additional capacity was built in. In its place a Vision and Validate (V&V) approach is adopted for Woodlands Garden Community; this helps to advance sustainably designed, low carbon and future-proofed settlements by placing greater importance on the vision. This defines what the vision will allow thus placing greater importance on sustainable (including virtual) mobility. Traffic here is a function of road space rather than the other way around, and it is that available road space that dictates demand.

4.4 To support the V&V approach the rapidly changing use of cars and attitudes to travel in recent years is presented in this section.

Covid-19 and the Shift in Trends

4.5 The Covid-19 pandemic has provided a step-change in working habits when it comes to revealing to employers and employees alike, that working from home or from a 'Third Place' is a viable and attractive option for every-day life. During the first Covid-19 pandemic in the UK, every worker who had the ability to work from home did so.

4.6 More than working habits however, the Covid-19 pandemic has shown people the benefits of local living and taking an active part in their local communities, something which a pattern of building dormitory settlements has eroded. It has never been more important to build for communities where residents can visit friends and family within their local neighbourhood, get a coffee, or pop to a shop for milk all within a walk or cycle from their home.

4.7 During the various lockdowns in the UK traffic on the roads reduced to unprecedented levels, and whilst these levels have very much bounced back as restrictions have eased, it demonstrates the extreme end of the scale that can be achieved as people learn to change habits.



4.8 New development must grasp the opportunities to provide for the change in behaviour by designing for liveability from the very outset.

Traffic Levels

4.9 Traffic being a function of road space is demonstrated time and time again where national and local traffic forecasts predict a steady increase in traffic in general accordance with population and economic growth, but this increase in traffic does not always occur despite this growth happening.

4.10 An assessment of trends in traffic flows within the vicinity of the site and in the area of Aztec West has been undertaken and the results presented below.

Local Road Network

4.11 Traffic survey data for between 1993 and 2007 has been obtained from the Bristol Open Data website[4] for the A38 between M5 Junction 16 and the Aztec West Roundabout (survey reference point 1050). This data is presented in **Table 4.1** as well as the 2016 traffic survey data that was used in the 2018 Transport Study.

Table 4.1: Traffic Data A38 Aztec West

Year	0800 to 0900	1700 to 1800
1993	4998	3376
1994	4824	4497
1995	4903	4046
1996	4982	4548
2001	3738	3903
2004	4641	5164
2006	4660	4571
2007	5030	4745
2016	4533	4349

4.12 **Table 4.1** shows that between the years of 1993 and 2016, the 2016 flows are lower in all years apart from 2001 for the AM peak hour. In the PM peak hour, 2016 flows are lower than all years apart from 1993, 1995 and 2001. This confirms that between 1993 and 2016 traffic flows have been relatively consistent with no real growth. Traffic flows on this link were higher in 1994 that what they were in 2016 in both peak hour periods, demonstrating that despite economic growth in the area, there has not been relative traffic growth.

[4] Traffic survey locations | Traffic survey locations | Open Data Bristol

4.13 From 2016 to 2024 there is no data available for this section of the network. ATC surveys have been undertaken on the local road network (January 2024) including Gloucester Road, Woodlands Lane, Trench Lane, and Brooke Way, and this is then compared to the 2016 traffic surveys that informed the 2018 Transport Study. Comparisons of the 2016 and 2024 surveys are provided in **Table 4.2**.

Table 4.2: Traffic Survey Data Comparison (2016 and 2024)

	AM Peak 0800-0900			PM Peak 1700-1800		
Location	**2016**	**2024**	**Change**	**2016**	**2024**	**Change**
Gloucester Road	2080	1842	-238	2310	1883	-427
Woodlands Lane	1182	580	-602	997	760	-237
Bowsland Way	265	266	1	277	224	-53
Trench Lane South	229	266	37	257	224	-33
Brooke Way	766	775	9	1004	1010	6

4.14 The data generally shows that traffic has reduced within the area. In particular, Gloucester Road and Woodlands Lane which are the busiest roads have experienced significant reductions in flows since 2016. This further demonstrates that since the original Transport Study was produced in 2018 there has been no growth on the local highway network.

Strategic Road Network

4.15 Further analysis of traffic data on the Strategic Road Network (SRN) including the M4 and M5 has been undertaken utilising data from the National Highways traffic database, WebTRIS. This considers mainline traffic flow changes between 2016 (when the surveys that informed the 2018 Transport Study were undertaken) and 2023 (the most recent year of available data). A summary of the location points and change in flow is provided in **Table 4.3** and comprises the 4 approach arms to the M4 Junction 20/M5 Junction 16. The data presented is weekday average data for the month of February, which is a neutral month.



Table 4.3: SRN Traffic Flow Trends

Location	Direction	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
		February		% Change	February		% Change
		2016 Flow	2023 Flow		2016 Flow	2023 Flow	
South of M4 J20	Northbound	4,180	4,204	0.57%	5,132	4,710	-8.22%
	Southbound	4,576	4,409	-3.65%	4,835	4,613	-4.59%
	Two Way	8,756	8,613	-1.63%	9,967	9,323	-6.46%
North of M4 J20	Northbound	1,746	2,043	17.01%	3,022	3,138	3.84%
	Southbound	2,692	3,139	16.60%	2,120	2,370	11.79%
	Two Way	4,438	5,182	16.76%	5,142	5,508	7.12%
East of M5 J16	Eastbound	2,767	2,599	-6.07%	3,390	3,197	-5.69%
	Westbound	3,388	3,223	-4.87%	3,037	2,898	-4.58%
	Two Way	6,155	5,822	-5.41%	6,427	6,095	-5.17%
West of M5 J16	Eastbound	4,021	3,901	-2.98%	4,687	4,570	-2.50%
	Westbound	3,842	3,917	1.95%	4,254	4,148	-2.49%
	Two Way	7,863	7,818	-0.57%	8,941	8,718	-2.49%

4.16 As shown in **Table 4.3** there has been a reduction in two-way traffic flows on the M4 south of J20, and on the M5 to the east and west of M5 Junction 16. Reductions in two-way flows of over 6% have been recorded.

4.17 It is noted that there has been an increase in vehicle movements on the M4 north of M4 Junction 20. Further analysis of traffic flow data on this part of the network shows a correlation between increased flow of traffic and the removal of the M4 tolls to Wales. **Figure 4.1** and **Figure 4.2** shows the changes in flow on this section of the network between 2014 and 2023 (all years where data is available). We have removed 2021 and 2022 data as this may have been impacted by COVID 19. 2020 flows are obtained for February before COVID-19 lockdown restrictions came into force.

Figure 4.1: North of M4 Junction 20 (AM Peak Hour 0800 to 0900)

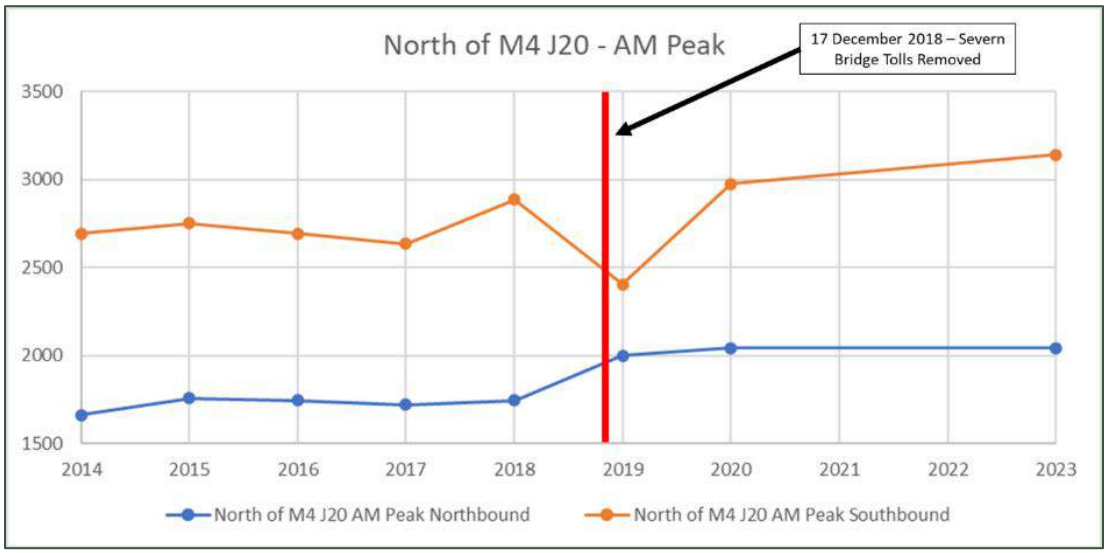
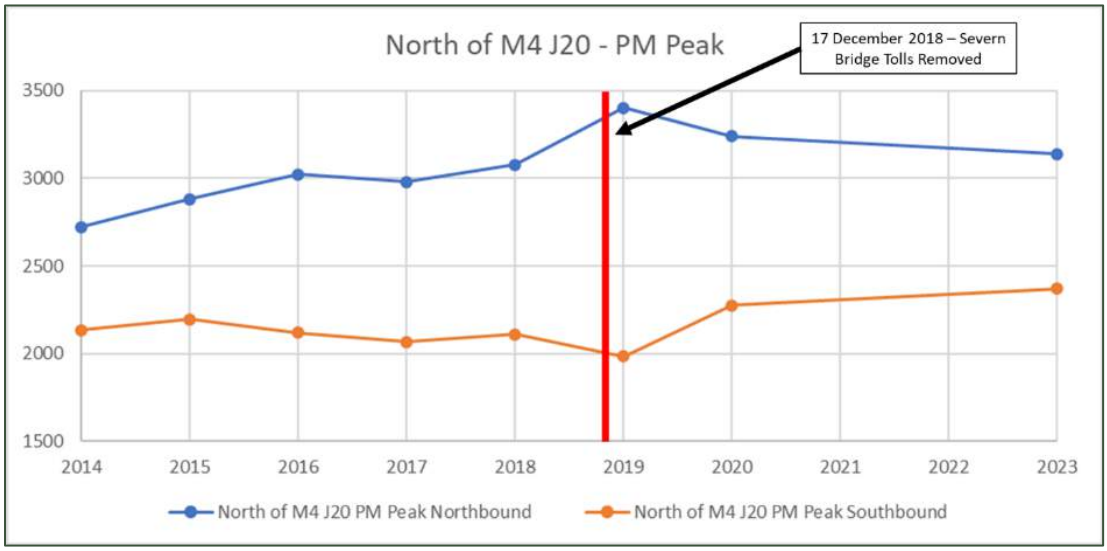


Figure 4.2: North of M4 Junction 20 (PM Peak Hour 1700 to 1800)



4.18 Before the data within **Figure 4.1** and **Figure 4.2** is analysed it should be noted that there is a dip in flows in 2019 for the Southbound flow in both peak hour periods. This is due to road works at the start of 2019 which extended into February, Which restricted southbound traffic to a single lane (southbound) and should therefore be discounted[5]. With this in mind there is a clear correlation with the removal of Severn Bridge Toll and increased traffic flows. This indeed supports the principles that increasing road capacity and making driving more

[5] https://www.bristolpost.co.uk/news/bristol-news/severn-bridge-roadworks-abandoned-after-2541671

convenient and attractive will simply increase the demand for vehicle trips. As such the increase experienced in this location is down to enhanced traffic conditions and lower costs making driving along this route more attractive.

4.19 As a result of the Covid-19 pandemic, traffic levels visibly decreased in 2021. Whilst traffic levels are, as of 2023, somewhat more reflective of the levels recorded pre-pandemic, it is evident that this change in habit is here to stay. The ability to work from home, for example, has remained a key factor in maintaining decreased traffic flows especially across the typical peak periods, and is an example of one of many factors which are contributing to traffic flows which are not quite in line with those predicted nationally and locally.

Conclusion

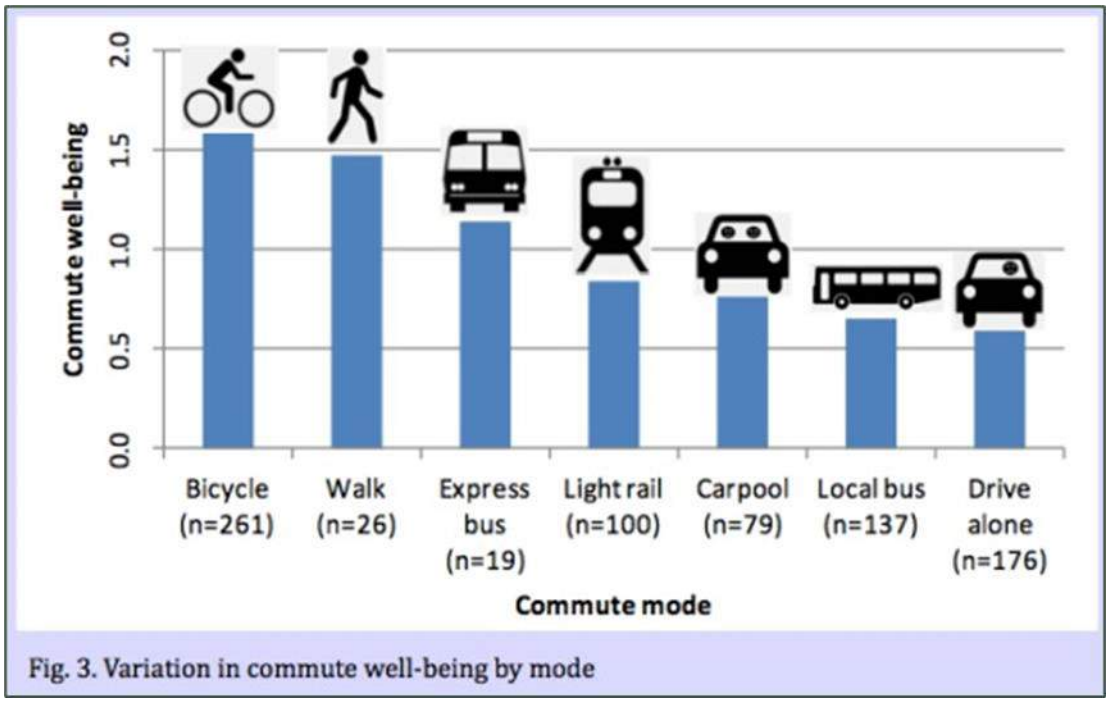
4.20 The data presented above confirms that there has been no growth on the local or strategic road network within the vicinity of the site despite there being continued economic growth in the area.

Commuter Wellbeing

4.21 Research published in the Journal of Transport and Health (March 2017, Volume 4) into commuter wellbeing ranked different modes of transport with car driver alone ranking the lowest and bicycle and walking featuring the highest. This bolsters the case for local living and for new settlements to be designed to accommodate active travel users as a highest priority. This is illustrated in **Figure 4.3.**



Figure 4.3: Commute Wellbeing



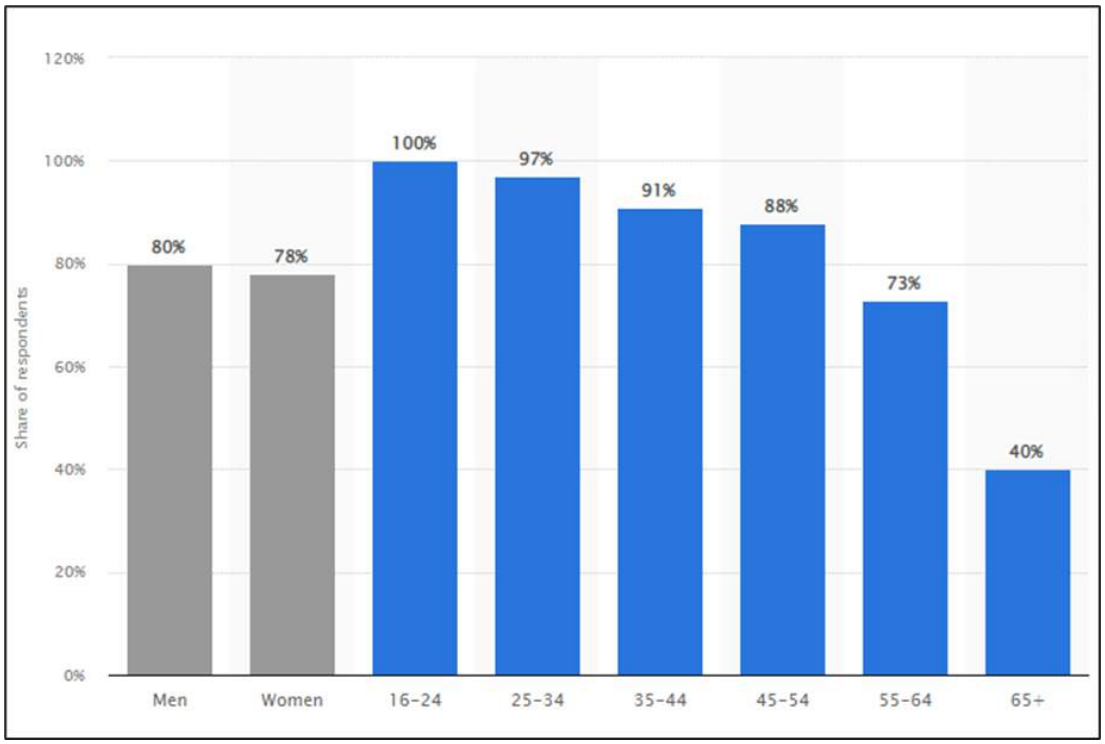
Smith et al 2-16: Commute well-being differences by mode

Intergenerational Divide

4.22 The intergenerational divide has increasingly shown how travel patterns and trends in movement patterns vary by age.

4.23 **Figure 4.4** shows mobile internet access by age group in Great Britain.

Figure 4.4: Internet Access By Age Group



(Statista 2019[6])

4.24 It is clear that younger generations are increasingly using their smart phones to access mobility and including payment for transport related activity, be it bus and rail journey planning and payments, e-scooters and e-bikes, taxi bookings such as Uber or demand responsive bus travel. This also extends to working and shopping all done virtually.

4.25 Advances in technology are quickly changing the way we live, and changing how we value time, how we value possessions, and how we achieve Mobility. Research undertaken in 2020 by Deloitte[7], states that the impact of the COVID pandemic has acted as a catalyst, speeding up consumer digital usage and introduced this new trend at a quick rate. The Deloitte research shows that 38% of respondents did more shopping online relative to pre-lockdown levels and half of these would maintain this behaviour post-lockdown. There has been a 22% increase in the number of people using online banking as a result of the COVID pandemic and of these 60% would continue to use online banking in future. 14% more

[6] https://www.statista.com/statistics/275985/mobile-internet-penetration-in-great-britain-by-age-and-gender/#:~:text=80%20percent%20of%20men%20aged,with%2078%20percent%20of%20women.&text=As%20of%202018%2C%2095%20percent,34%20years%20owned%20a%20smartphone.

[7] https://www2.deloitte.com/uk/en/pages/technology-media-and-telecommunications/articles/digital-consumer-trends-lockdown-behaviour.html

people in the study have used virtual appointments with medical staff and of these 25% would continue to do so in future.

Car Ownership

4.26 In the past there has been significant growth in the number of households with access to a personal vehicle, spurred in part to the decreasing relative cost of owning a vehicle over the same period (as shown by the National Travel Survey). This is despite vehicles being parked on average 80% of the time.

4.27 With changing attitudes to car ownership and increased opportunities to relinquish ownership of a car (such as car clubs), private car ownership is anticipated to decline.

4.28 This reflects the changing attitudes of younger generations such as millennials towards the car, where Prophet Marketing Agency have reported the following:

- 67% of millennials would rather buy a used car and spend the saved money on other things;
- 65% say that the latest smartphone has more value to them than the recent model of a car;
- 50% agree the car is losing its significance as a status symbol among their peers; and
- 69% are sure that car sharing and carpooling should be more common that car owning.

4.29 The Department for Transport (DfT) also report that young people have become ‘accustomed to a lifestyle in which private car use is less central than it has been for previous generations’, and that ‘it is possible that the changes in young people’s travel behaviour described above are the first phase of a social change that will continue through successive generations’.

4.30 Car ownership no longer defines status or aspirations. With the rise in working from home or a Third-Place, fewer people are likely to see a future living in dormitory (or sleeper) settlements and commuting to a single place of work. This has led to a marked decrease in car ownership among the younger generation over the past 25 years.

Electric Vehicles

4.31 The UK has announced that from 2035, new petrol and diesel car and van purchases will be banned in lieu of electric, or hydrogen powered vehicles. The same will happen for HGVs from 2040.

4.32 Electric vehicles (EV) or battery electric vehicles (BEV) are already on the rise, with an increasing proportion of car purchases per year being electric (BEV, battery electric vehicle) or hybrid (PHEV, plug-in hybrid electric vehicle). In Q3 of 2023, 15.4% of all newly registered cars in the UK during this quarter were EVs (Department for Transport statistics, Tables veh0132 and veh0105). The current trends towards EVs will only accelerate as the UK attempts to phase-out combustion engine vehicles by 2035.

4.33 The South Gloucestershire publication Electric Vehicle Charging Strategy (March 2023) states that South Gloucestershire has seen significant growth in EV sales over the past six years and this has been reflected in the uptake of EV charge point grants as shown in **Figure 4.5**.

Figure 4.5: South Gloucestershire EV Charging Points Installed

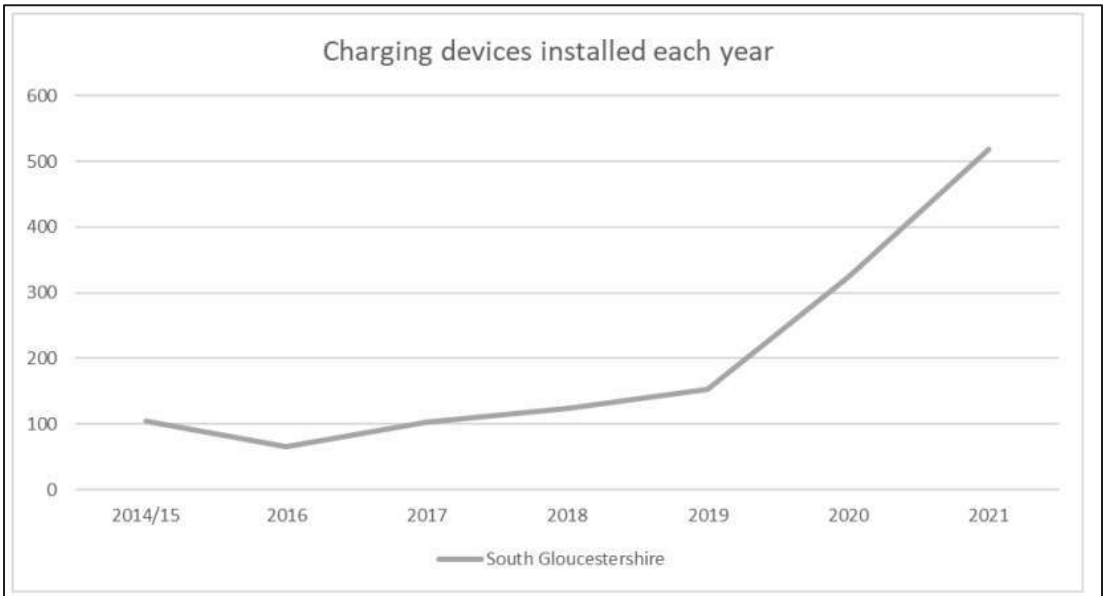


Figure 2: EVHS uptake in South Gloucestershire

4.34 SGC Council are forecasting[8] that 29.4% of total vehicles in South Gloucestershire will be EVs by 2030.

[8] South Gloucestershire Electric Vehicle (EV Charging Strategy) 2023

4.35 EVs form a large part of the Decarbonising Transport strategy set out by the UK Government, and infrastructure to support use of EVs is being developed quickly across the UK. Development at Woodlands will support this policy aspiration and trend by providing EV charging capabilities for every home in line with Building Regulation guidance, as well as at workplaces and public parking areas. Parking strategies such as communal residential parking hubs will be considered to reduce the dominance of the car in the placemaking of streets and home fronts.

4.36 Hydrogen uses are also a consideration and will be factored into the aspirations for Woodlands.

Summary

4.37 This section summarises the direction in which attitudes to travel and mobility are heading, and the changes already being seen in the UK. National transport policy is moving away from ‘predict and provide’ to a ‘vision and validate’ approach which encompasses a holistic multimodal approach, supporting access to development by walking, cycling and public transport in the first instance.

4.38 Travel trends are changing with a growing greater interest on getting mobility via a smart phone over owning a car. Liveability is at the forefront of minds particularly following the Covid-19 pandemic, where health and wellbeing are acknowledged to be of the upmost importance. Placemaking plays a role in delivering a place to live and work that achieves these goals, which play hand-in-hand with the climate aspirations of the UK.

4.39 These trends are inescapable and, in application to Woodlands, can be grasped from the very outset of development given its accessible location that offers, in particular, access to a large number of employment opportunities via public transport, walking or cycling. Woodlands has the opportunity to develop a truly liveable community in this part of South Gloucestershire, which encourages a shift away from reliance on less sustainable modes of transport.



5.0 Vision and Validate Approach

Introduction to Vision and Validate

5.1 The vision and validate approach at Woodlands Garden Community will embrace a place-based solution with provision of services and facilities that communities need in a 15-minute neighbourhood, thereby minimising the need for individual travel.

5.2 The Mobility Strategy supports the vision by following the SAM (Sustainable Accessibility and Mobility) Framework (RTPI, Net Zero Transport: the role of spatial planning and place-based solution. January 2021)

5.3 The first stage is substitution of trips, this is minimising travel demand by applying 15-minute neighbourhood principles to site design. Shifting modes is making active and shared mobility the natural choice over the private car, with MaaS (mobility as a service) enabled transport options. Finally, switching fuels refers to minimising the most polluting fuels. Futureproofing of proposals to provide charging infrastructure is crucial.

The Access Hierarchy

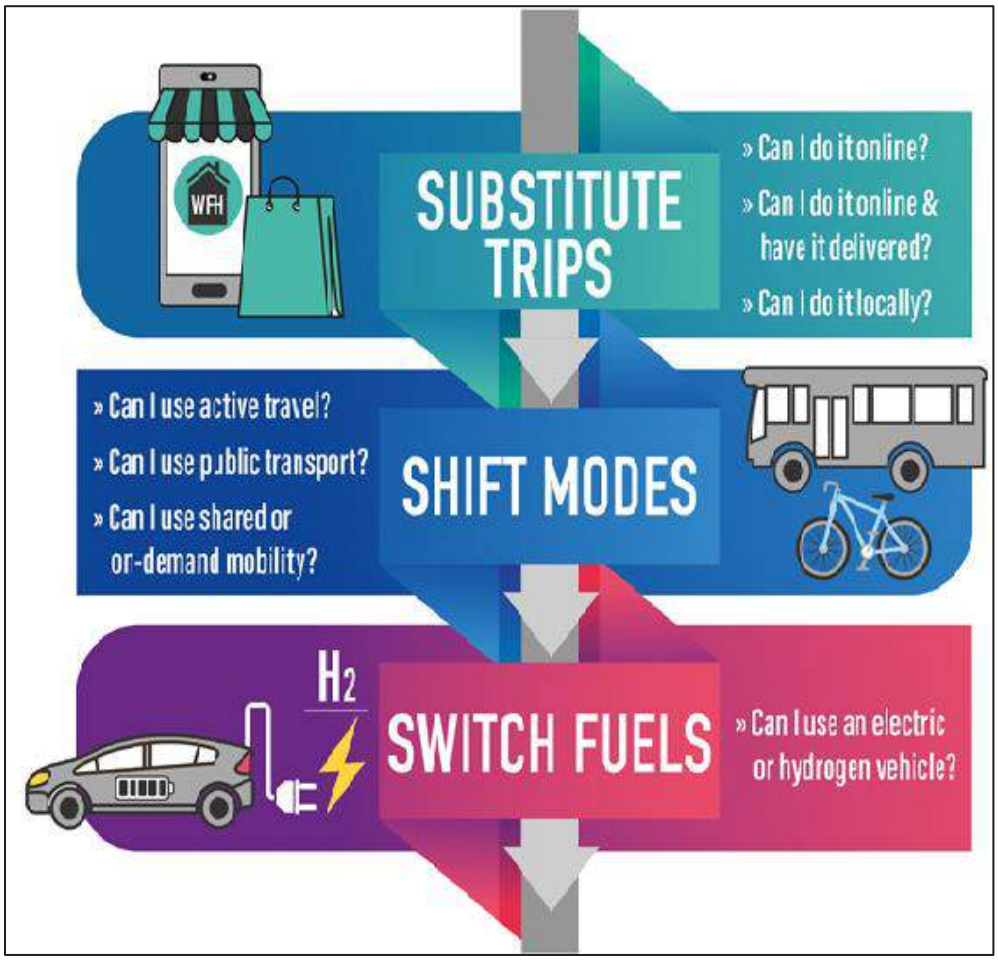
5.4 The latest thinking in transport planning terms considers travel as the third and fourth question to ask with regards to gaining access to services and facilities, with alternative options considered before that. Traditionally, when an individual wants to gain access to services or facilities, they would have needed to travel to visit the shop/facility in person. However, over time, and due to technological advances, this has changed and accessing services and facilities in modern life is different and, in many instances, adopts the following approach:

- Can I do it online?
- Can I do it online and get it delivered?
- Can I travel locally (i.e., "active" (such as walking or cycling) travel)? and, finally
- I need to travel further so what is the most sustainable method?

5.5 Only once all of these questions have been answered, would people consider the use of the private car. As a consequence of the COVID pandemic there has been a shift to home working and virtual mobility which also reduced the overall need to travel, and this trend will need to be accommodated with new modern development which focuses on placemaking.

5.6 The overall all approach is shown in **Figure 5.1**.

Figure 5.1: Access Hierarchy



5.7 This approach is consistent with the South Gloucestershire transport hierarchy[9]. The hierarchy is shown in **Figure 5.2**.

[9] South Gloucestershire Electric Vehicle (EV Charging Strategy) 2023

Figure 5.2: SGC Transport Hierarchy

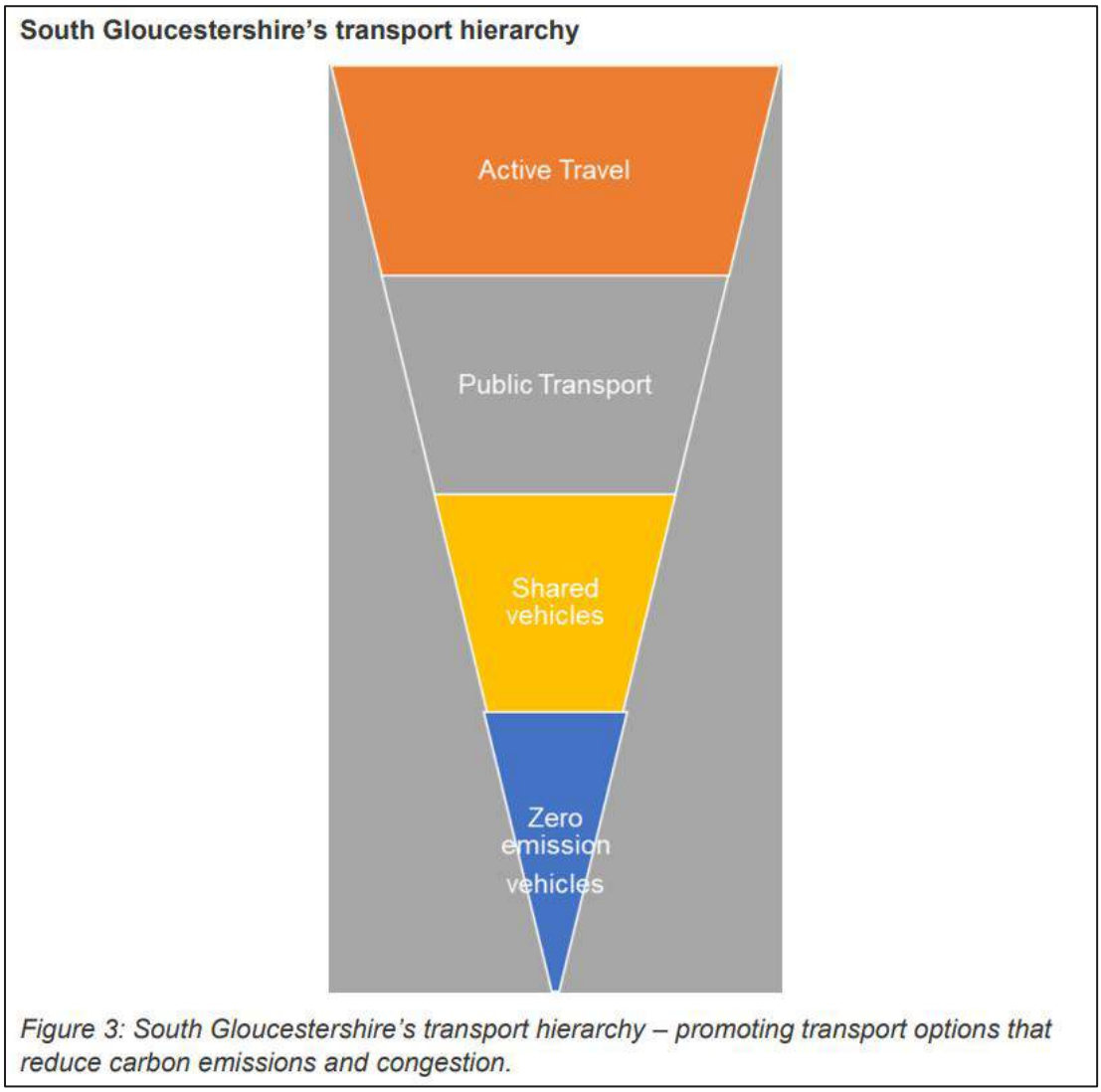


Figure 3: South Gloucestershire's transport hierarchy – promoting transport options that reduce carbon emissions and congestion.

5.8 The vision[10] set by South Gloucestershire is:

"The overall transport vision for South Gloucestershire is to prioritise sustainable transport options. There are numerous benefits to individuals, places, and the environment more widely. As such, we are committed to reducing car use overall across the district in favour of active travel and public transport options. When trips need to be made by private vehicle, we want them to be made by EV".

[10] South Gloucestershire Electric Vehicle (EV Charging Strategy) 2023

Substitute Trips

Virtual Mobility

Super Fibre Broadband

5.9 It is proposed that each property at Woodlands will benefit from full fibre internet to maximise connectivity and to encourage the avoidance of trips by enabling servicing to be accessed directly from home.

Covid-19 as a Catalyst

5.10 The way we live and the value we place on time has been accelerated as technology advances. We now pursue day to day activities in the 'physical' sense where the concept of using technology to bridge the digital world with the physical world we live in is more convenient. This includes mobility as well as online shopping, socialising, and work.

5.11 The latest Deloitte research has shown that these trends which accelerated during the Covid-19 lockdowns has plateaued, but remains at an all-time high.

Working from Home/Third Place

5.12 During the first (and subsequent) Covid-19 lockdown in the UK, every worker who had the ability to work from home did so. Working from home has now become an acceptable way of working for many employers, and the benefits are now apparent.

5.13 The concept of a 'third place' within the site becomes significant in the context of a 15-minute town. Facilities will exist within the site and provide a middle ground between 'home' and 'work'. These 'third places' can provide a boost to the local economy, capturing business during the day where people may otherwise be at their place of work and where they might seek a change from the home working environment. This helps to create vibrant communities by bringing neighbours together. The rise of remote working, stimulated greatly by the Covid-19 pandemic, creates an opportunity for a market town renaissance whereby residents can live, work, and spend within the settlement, regardless of the location of their employment.

5.14 SLR Consulting (previously Vectos) has created a tool to determine the increase in WFH proportions for each Local Authority District Area across the UK based on ONS data. The data demonstrates that in 2019, in urban cities and towns within South Gloucestershire, 13.6% of all working residents were working from home at least 1 day a week. As of December 2023, this figure had increased to 27.8%. This equates to an increase in the WFH population of 104% over the space of four years. It is estimated that at this level of WFH, for every 100 residents aged between 16-74, 6,842 car trips are avoided per year. On the scale



of the proposed development there is the potential for a considerable number of trips to be avoided by enabling future residents to WFH effectively.

5.15 The local living aspect of the site will provide a higher containment of trips, with longer distance private car journeys being replaced by sustainable travel patterns within the local area. Therefore, it is not anticipated that there will be any greater burden upon the surrounding transport networks.

5.16 The development will also provide facilities to operate as a third place of work such as coffee shops and co-working space.

Can I do it online and get it delivered

Micro-consolidation

5.17 It is proposed that each property will benefit from full fibre internet to maximise connectivity and to encourage the avoidance of trips by enabling servicing to be accessed directly from home.

5.18 Measures such as Amazon lockers could be provided at the mobility hub or local retail.

5.19 The key advantage would be to reduce the amount of vehicle trips within Woodlands Garden Community itself, creating a more attractive environment for pedestrians and cyclists. i.e., one delivery vehicle can drop off parcels for all site addresses within a single location (rather than delivering directly to each individual property) and then those parcels are distributed out within the site by sustainable modes such as cargo bikes.

Can I do it locally - On-site Facilities and Containment

Local Living

5.20 Local living or 'liveability' is at the forefront of people's minds right now and 15-minute neighbourhoods are based upon a design ethos of creating complete, compact, and connected neighbourhoods where people can meet their everyday needs within a short walk or cycle.

5.21 This is not a new concept and historically many towns and cities have evolved around a model similar to a 15-minute neighbourhood. The emergence of these walkable places to live has grown around the world, and the need for them has only been quickened by the Covid-19 pandemic which has put a spotlight on the importance of the liveability of where we live.

5.22 This idea presents multiple benefits including boosting local economies, improving people's health and wellbeing, increasing social connections in communities, and tackling the climate change emergency.



5.23 In taking advantage of two key attributes, size and location, the site at Woodlands Garden Community paves the way for numerous measures and strategies to encourage local living and support the initiative of 15-minute neighbourhoods.

5.24 The new community will be developed in the context of local living, delivering a design that maximises the attractiveness of active travel as well as the provision of complementary land uses on site **Figure 5.3** illustrates how containment might work.

Figure 5.3: Local Living (15 Minute Neighbourhood Approach)



5.25 The fully permeable layout of Woodlands will typically be dominated by an active travel network at a local level with a full and priority network for cycling. On site facilities will be provided which include:

- community facilities, a primary mobility hub (as described further below), primary education, a local centre which enables future residents to live locally and reduce the need to travel off site; and

- parcel lockers adjoining the mobility hub for on-line deliveries to be dropped off and collected at convenient times enabling future residents to collect items locally.

Shift Modes

Mobility Hub

5.26 A primary mobility hub will be at the heart of the development with supplementary hubs interspersed. This forms a focal central point for people to meet, interact, work, and spend time. The Mobility Hub could also provide a range of facilities, being co located adjacent to the local centre.

5.27 The Mobility Hub would be highly accessible by active and public transport modes, offering safe and secure cycle parking, as well as potentially a bike repair shop. Car club and carpooling spaces would be made available, as well as EV charging points and a comfortable bus stop. It might include a small café, all seeking to make this a central place to encourage community interaction and naturally promote sustainable transport choices.

5.28 Car free, or low car, neighbourhoods, where the primary network is the active travel network lend themselves to a network of Mobility Hubs either Primary, Secondary or Tertiary could be incorporated into the design.

5.29 Primary Mobility Hubs will be located in local centre with the potential for smaller secondary or tertiary hubs also located within the development.

5.30 **Figure 5.4** shows what the primary mobility hub within the site might look like.

Figure 5.4: Primary Mobility Hub Illustration



5.31 The primary mobility hub could include a mix of uses such as:

- High-quality bicycle parking
- Bicycle repair stations;
- Bike and e-bike share;
- Connected active travel routes;
- Cargo bike share;
- EV car club;
- DRT pick-up/drop-off bays;
- EV charging points;
- Secure parcel lockers;
- High speed free Wi-Fi;
- Real time travel information;
- Wayfinding totem signage for onward active travel journeys;
- Proximity to public transport stop;
- Appropriate safety infrastructure such as lighting;

- Shower facilities;
- Community concierge features include;
- Micro-consolidation centre for parcel receipt, including onward last-mile delivery by cargo bike or ground drone for example;
- Third place working hub;
- Café and community meeting space;
- Travel Planning servicing including for schools;
- Coordination of local walks and cycles; and
- Management of IT platforms for car sharing and DRT.

Active Travel

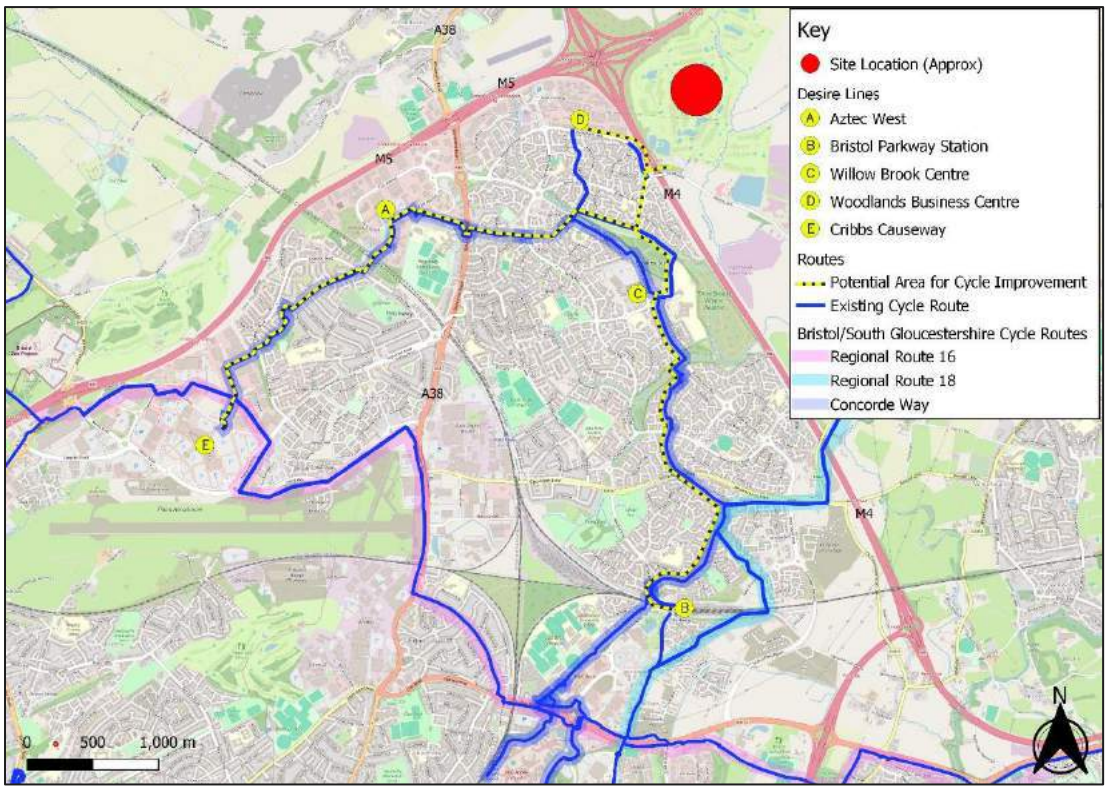
5.32 Active travel provision will start at the local level with a network of greenways which prioritise active travel and e-mobility (including electric bikes and scooters) enabling future residents to travel around the site and further afield by means other than the car.

5.33 The active travel strategy, which is to be investigated in combination with SGC is likely to include:

- Creation of an Active Travel Link between the site and Concorde Way Cycle Route
- Review and improve Active travel links to Aztec West and Woodlands Business Park;
- Review and improve Active travel links to Parkway Rail Station, Willowbrook Retail Park and Bradley Stoke Leisure Centre; and
- Review and improve Active travel links to Cribbs Causeway and Bristol City Centre.

5.34 A plan showing these routes are shown in **Figure 5.5.**

Figure 5.5: Active Travel Strategy



Public Transport

5.35 The development will provide investment into public transport provision, details of which are to be discussed with the highway authority.

5.36 There is currently a good level of service within close vicinity of the site, with the 73-service operating every 30 minutes within 350m walk of the site access from Trench Lane and Woodlands Lane. Additionally, the T1 service which operates every 20 minutes can be reached within a 1200m walk from the site access from Bradley Stoke Leisure Centre. Discussions are ongoing with First Bus Bristol, Bath & The West regarding potential extensions or diversions of these routes for services to route through the site.

5.37 The intention will be for all residents to be able to access a regular bus service within 400m from their individual property.

5.38 The provision of regular services accessible within a short distance of residents will encourage travel by public transport to key locations, such as Bristol city centre which is served by both the 73 and T1 service.

5.39 We have engaged with Frist Bus who have suggested that there is potential scope for the T1 bus service to be routed through the site. Frist Bus suggested that if funding is made available for an extra bus, then the T1 could operate on 30-minute frequency between Thornbury and Bristol City Centre via Almondsbury (as per the existing route) and a 30-minute frequency between Thornbury and Bristol City Centre via Woodlands. This is subject to further assessment.

5.40 **Figure 5.6** provides a summary for the existing route.

Figure 5.6: Existing Bus Route (T1)



5.41 **Figure 5.7** provides a summary of the potential future route

Figure 5.7: Potential Bus Service Arrangement (T1 Altered Frequency & New Route)



Car Club

5.42 A Car Club will be provided at the Primary Mobility Hub. A car club is where several people access and drive the same vehicle. For example, several people in the same community would drive the car on different days of the week utilising a booking service.

5.43 This means that drivers have access to cars without the need to own them. Access without ownership is becoming more common in modern-day living as it takes away the pressure and cost of having to maintain a vehicle. It also provides scope for residents to make use of external spaces or garages on their property in other ways, without having the need to accommodate a vehicle.

5.44 Studies have demonstrated that each shared car replaces between eight and eleven private cars. Car clubs are becoming more prominent in towns and cities across the UK, and car club spaces can be located strategically at key destinations, major employment sites, transport hubs, and town and city centres. The membership of car clubs is increasing, reflecting people's changing attitudes towards Mobility.

5.45 The provision of a car club will encourage residents to adopt more sustainable travel habits with the knowledge that should an emergency arise, or there be a need to travel quickly, run

an errand, collect a parcel, or vary a journey in another way, there is a flexible option which can be used as required on-demand.

5.46 Enterprise Car Club operates 2,000 vehicles nationally and has expanded to 30 new locations in the past 3 months. Research undertaken by Enterprise Car Club indicate that in the last 12 months each car club replaces 10.5 vehicles from the road. Enterprise Car Club has almost eliminated diesel vehicles from their fleet and 18% of the fleet in London is now electric or hybrid electric.

Switch Fuel

5.47 The development proposal could include an EV charging station. This will provide space for residents and customers to park their cars. It also provides the opportunity for people to park at the EV charging station and use the park and ride services, or to cycle to their destination using some of the new cycle route proposed.

5.48 Additionally, in line with Building Regulations Approved Document S, the development will provide each residential dwelling with an EV charging point from the outset.

Summary

5.49 The proposal would provide an exemplar highly accessible and sustainable development ensuring that residents can gain access to services and facilities within the site itself or by excellent sustainable transport choices.

6.0 Access Strategy

6.1 This section of the report set out the access strategy for the development.

Vehicle Access

6.2 The proposals for vehicle access remain unchanged from that set out within the 2018 Transport Study. The proposals are replicated below.

6.3 The proposed scheme includes access points directly from Trench Lane and Hortham Lane. There is also the potential to connect these two accesses through a development spine road. The design of the spine road would be in line with the requirements of Manual for Streets and will take into account the principles of placemaking and a street for all rather than an emphasis on the private car.

6.4 The spine road is likely to be designed as follows:

- 6.5m carriageway;
- 2m footway on one side of the road;
- 3m / 4m shared cycle way on one side of the road; and
- Access Road to be designed on the basis of MfS principles.

Southern Access

6.5 It was proposed that the southern access to the site would be gained directly from Trench Lane via a new three-arm roundabout. This would form the primary access to the site. The design of the proposed main access is shown in **Drawing 162451_PHL_06** contained at **Appendix B**. A detailed capacity assessment of the site access was undertaken as part of the 2018 Transport Study and showed that this form of junction operates well within capacity, even with all development traffic routing through it (assuming no link road or northern access junction). Details of the modelling work are re-provided at **Section 6** of this report.

Northern Access

6.6 It is proposed that a northern access is provided from Hortham Lane to the north. This will take the form of a T-Junction arrangement as shown in **Drawing 162451_PHL_05** contained within **Appendix B**. Observed traffic flows along Hortham Lane are low and we do not anticipate any capacity issues.

Active Travel Access

6.7 It is proposed that a new bridge over the M4 parallel to Trench Lane bridge is provided which would create a new dedicated link for cyclist and pedestrians and which would provide a direct connection into the site.

6.8 An indicative scheme layout of the bridge is provided in **Drawing 162451-GA-01** contained within **Appendix B**.

6.9 This would not be accessible for vehicles and therefore would provide a segregated and direct pedestrian and cycle link between the site and Woodlands Lane.

Off-Site Active Travel

6.10 Active travel provision will start at the local level with a network of greenways which prioritise active travel and e-mobility (including electric bikes and scooters) enabling future residents to travel around the site and further afield by means other than the car.

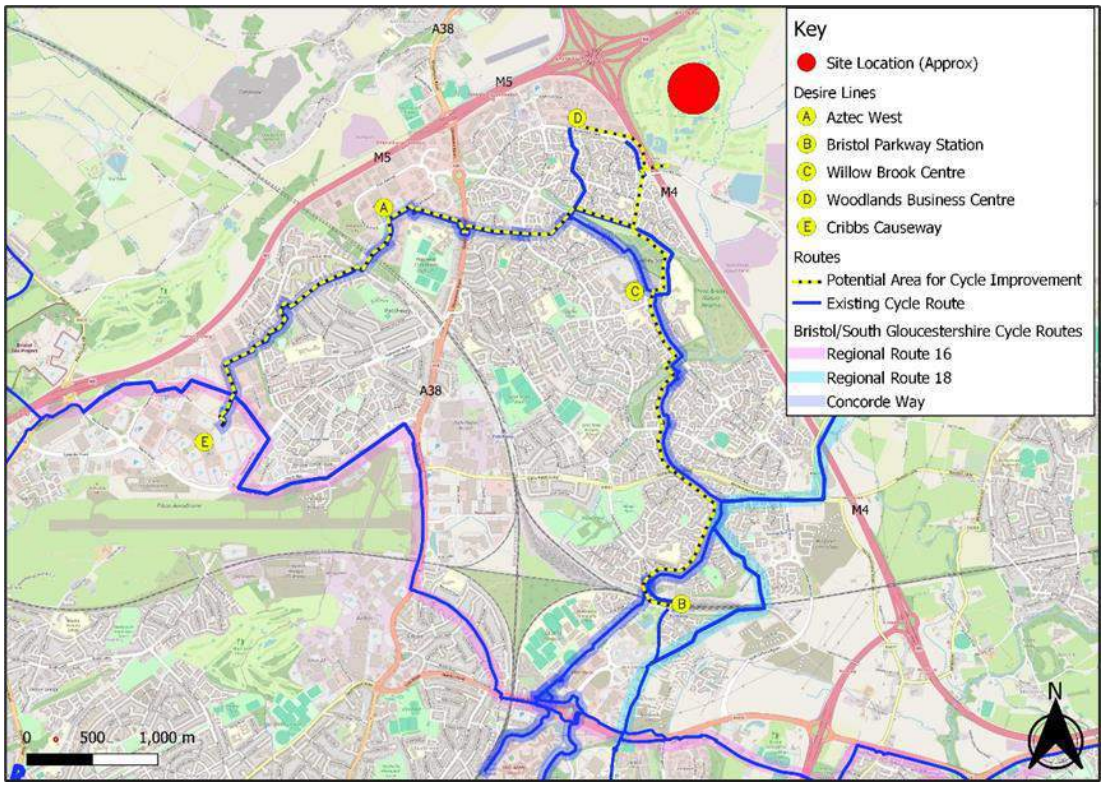
6.11 The active travel strategy, which is to be investigated in combination with SGC includes improvements to:

- Creation of an Active Travel Link between the site and Concorde Way Cycle Route
- Review and improve Active travel links to Aztec West and Woodlands Business Park;
- Review and improve Active travel links to Parkway Rail Station, Willowbrook Retail Park and Bradley Stoke Leisure Centre; and
- Review and improve Active travel links to Cribbs Causeway and Bristol City Centre.

6.12 A plan showing these routes are shown in **Figure 6.1.**

6.13 Enhancement to these routes would not only benefit those residing within the development, but would also provide wider benefits to existing residents and employees in North Bristol.

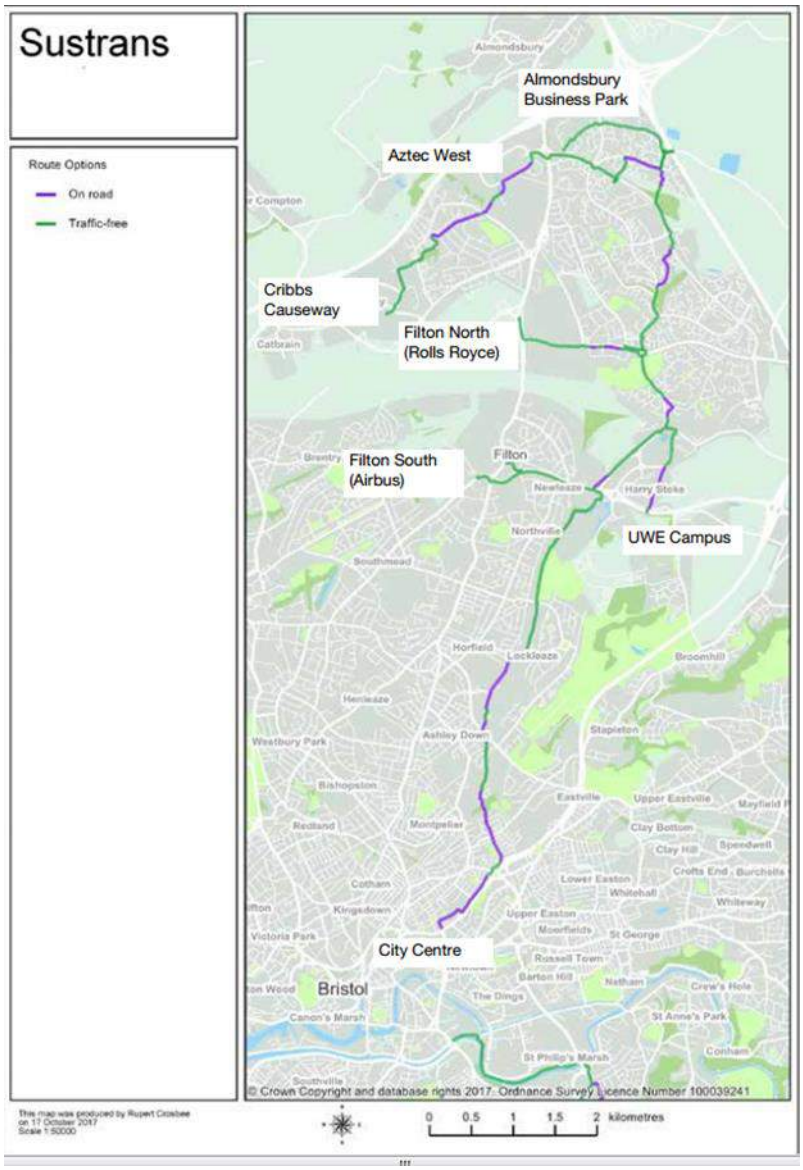
Figure 6.1: Active Travel Strategy



6.14 As part of the 2018 Transport Study, SUSTRANS were instructed to develop a network of active travel routes servicing the development site which would focus on creating High-Capacity Transport Network (HCTN) between the site and major trip destinations.

6.15 The proposed strategy as per the 2018 Transport Study is set out in **Figure 6.2**. However, SGC has confirmed that the active travel strategy for the Local Plan will need to be developed in conjunction with themselves. Notwithstanding this, the 2018 SUSTRANS work provides a good basis to start from and key parts of the identified improvement works could still form part of the mitigation package for Woodlands if considered necessary.

Figure 6.2: SUSTRANS Proposed Improvement Strategy



7.0 Trip Generation and Assessment

2018 Transport Study

7.1 This section provides a high-level summary of the analysis work undertaken in 2018 as part of the promotion of the site for the Joint Spatial Plan. A comprehensive update of this work will be produced to support a planning application.

7.2 A Transport Assessment scoping report has been issued to SGC and the scope of the modelling assessment work and trip generation are currently being developed and agreed with SGC.

Trip Generation

7.3 The 2018 Transport Study considered that transport impact of a development comprising 2,000 dwellings, a 2 Form Entry Primary School, Retail Provision and Local Centre and Care Home.

7.4 **Table 7.1** provides a summary of the traffic forecast that was used to assess the impact of the 2018 scheme.

Table 7.1 – 2018 Trip Generation

Development Traffic			
Period	**In**	**Out**	**Total**
0700 to 0800	106	395	500
0800 to 0900	166	567	733
0900 to 1000	216	270	486
1600 to 1700	440	245	685
1700 to 1800	544	312	856
1800 to 1900	382	265	647

7.5 Whilst the traffic forecast as set out in **Table 7.1** includes assumptions relating to trip containment, it does not account for netting of the traffic forecast associated with the extant use of the site or any reduction to account for the implementation of Travel Plan measures. As such the analysis work provided a robust basis for assessment.

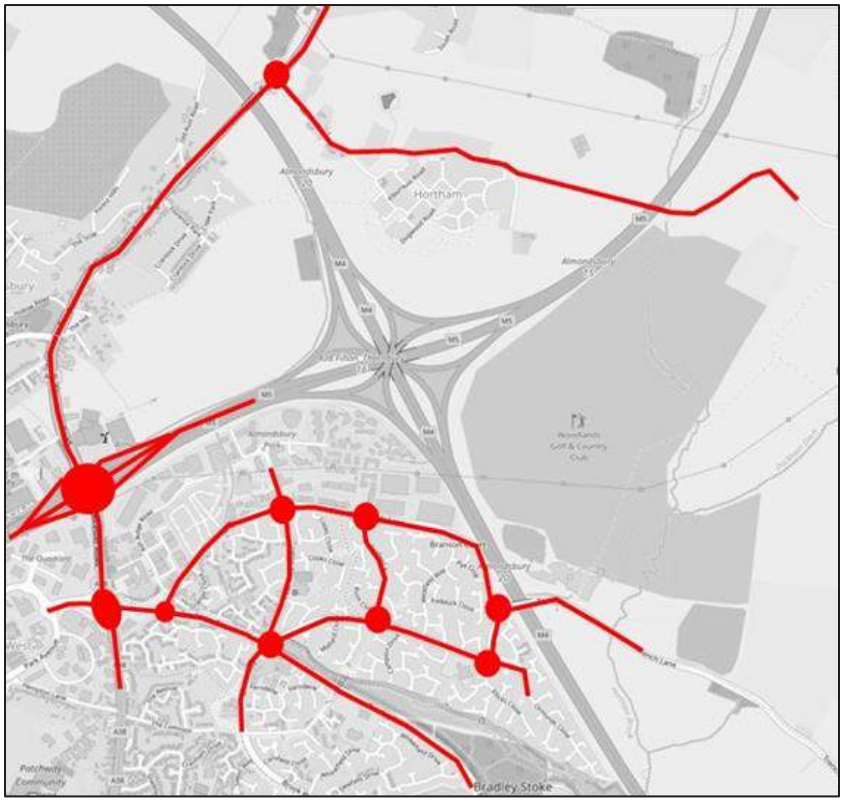
7.6 The traffic forecast associated with Local Plan ambition of delivering 1,175 dwellings within the plan period, a primary school, and local centre in the plan period would be considerably lower.

7.7 The approach that should be undertaken for any updated assessment work will focus person trips and the hierarchy of modes of travel as set out earlier within this document.

Extent of Modelling

7.8 The assessment in the 2018 study was based on VISSIM model as per the network shown in **Figure 7.1**.

Figure 7.1: 2018 VISSIM Model Network



Assessment Scenarios

7.9 The VISSIM model considered the impact of the development for the AM and PM peak periods for 2017 (survey year) and a forecast year of 2036.

7.10 A set of robust growth factors were applied to the 2017 base flows to forecast 2036 flows which equated to a 15% increase in baseline traffic data. This should be considered in the context of the trends set out within **Section 3** of this report which shows that there has been no growth on the network since the collection of data in 2016.

7.11 As such, the capacity assessment work undertaken as part of the previous assessment continues to provide a robust assessment of the network following the development proposals.

7.12 A scoping document has been issued to SGC highways to agree the scope of the updated assessment.

Site Access Capacity

7.13 There are no capacity issues at the site accesses.

Wider Network Impacts

7.14 The assessment included two development scenarios; one which included an access onto Trench Lane only (no spine road); and another which included an access onto Trench Lane and Hortham Lane (with spine road).

7.15 The assessment contained within the 2018 Transport Study considered queuing for these scenarios reported within the VISSIM model at the following junctions:

- M5/A38 Junction 16;
- Aztec West Roundabout (A38/Bradley Stoke Way);
- Woodlands Lane/Bradley Stoke Way;
- Pear Tree Road/Bradley Stoke Way; and
- A38/Hortham Lane.

7.16 The study concluded that the impacts of the Woodlands development would result in minimal increases in queuing at all junctions with the exception of the M5/A38 Junction 16. This junction was forecast to increase queues by up to 32 vehicles on any arm in the PM peak hour. The impact in the AM peak hour was negligible.

7.17 The Transport Study concluded that a cumulative scheme for a junction improvement at M5/A38 Junction 16 would be proposed and the Woodlands scheme would provide a contribution towards such a scheme.

7.18 The 2018 Transport Study also considered network delay. This considered delay across the entire VISSIM network, which covered a significant area as presented in **Figure 7.1**. The assessment found that with the delivery of the Woodlands scheme (with spine road), there would be a network delay increase of 16 seconds in the AM peak hour, and 51 seconds in the PM peak hour. This level of delay was not considered to be severe in the context of the delivery of 2,000 dwellings and that this additional delay would be experienced across the whole network, not just at individual links or junctions. It is also noted that the assessment considers a robust test of the development proposals, as set out previously within this Chapter.

7.19 Notwithstanding the above, development proposal for the plan period is 1,175 dwellings which is considerably lower than the dwelling number (2,000) that the 2018 Transport Study



assessment was based on. Equally, the 2018 assessment included robust growth factors and it has since been shown that there has been no growth on the road network. As such the 2018 model is likely to have overestimated network traffic flows and development traffic flows and overall, the network is likely to operate better than what was reported in the 2018 Study.

7.20 An updated assessment methodology is currently being agreed with SGC highways, which takes the form of the vision and validate approach.

8.0 Local Plan Stage 1 Modelling Outputs Reports

Introduction

8.1 The Stage 1 Modelling Outputs Report was published by SGC in January 2024, and forms an evidence base for the New Local Plan. The report presents the inputs considered for the development lenses and the respective model outcomes, the report is based on the West of England Regional Transport Model (WERTM) suite consisting of Highway Assignment Model (HAM), Public Transport Assignment Model (PTAM) and Variable Demand Model (VDM) components to develop forecast year model scenarios for 2042 with SGC's Local Plan development changes.

8.2 Three Do Something (DS) lenses have been tested at this stage and the impacts on the transport network, measured against the Do Minimum (DM) scenario. These are described below:

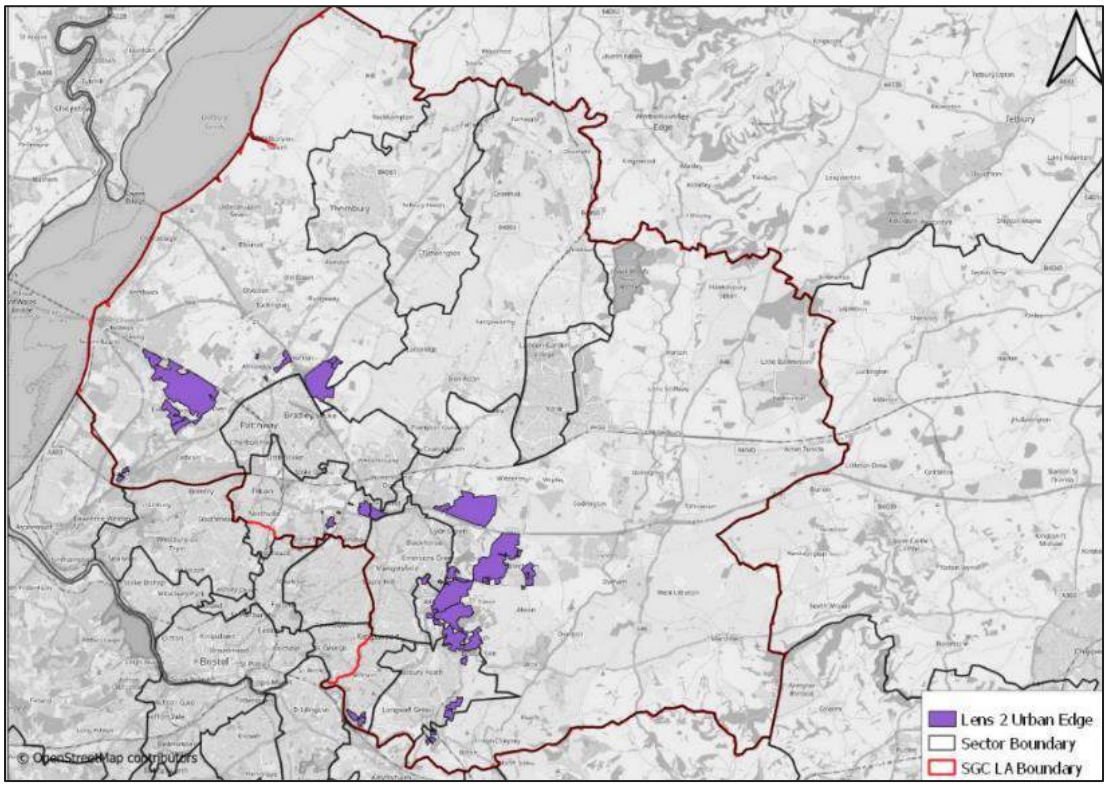
- **2042 Do Minimum**: this is the 2042 scenario with no Local Plan, but includes committed development and transport schemes which are assumed to have been completed by 2042;
- **2042 Do Something (Lens 1)** – Local Plan with no Green Belt Loss;
- **2042 Do Something (Lens 2)** – Local Plan Urban Edge; and
- **2042 Do Something (Lens 3)** – Majority of new homes provided along already established key public transport routes and hubs.

8.3 The relevant scenario for Woodlands Garden Community is the Lens 2 assessment which differs from the Preferred Strategy.

Lens 2 Development

8.4 **Figure 8.1** shows the location of the Lens 2 sites.

Figure 8.1: Lens 2 Sites



8.5 **Figure 8.2** provides a summary of the Housing and Job Numbers in Lens 2, which has been taken directly from the Local Plan Stage 1 Transport Report.

Figure 8.2: Lens 2 Development Assumptions

Sector	Dwellings	Jobs	% of Dwellings	% of Jobs
Kingswood	333	138	2.5%	1.0%
Pilning, Severn Beach and Woodhouse Down	3,747	2,956	28.5%	22.2%
Filton, Bristol Parkway & Frenchay	794	999	6.0%	7.5%
Iron Acton & Charfield	114	48	0.9%	0.4%
Pucklechurch & Chipping Sodbury	7,096	7,586	53.9%	56.9%
Mangotsfield	64	27	0.5%	0.2%
Longwell Green	1,018	1,572	7.7%	11.8%
SGC Total	**13,166**	**13,326**	**100%**	**100%**

8.6 The Lens 2 assessment comprises of 13,166 new dwellings and 13,326 new employment opportunities (jobs). The Lens 2 assessment does not account for any associated transport enhancements to mitigate the impact of the Local Plan.

8.7 It is not clear from **Figure 8.2**, where the Woodlands allocation is accounted for within the Lens 2 assumptions. SGC has confirmed that the modelling includes 1,170 homes, a primary school and local centre for the plan period. This is split between Woodlands Garden Community (875 dwellings) and the two adjacent plots (205 dwellings). The modelling assumed that there is an access onto Trench Lane and Hortham Lane, but it does not assume a link road connecting Trench Lane and Hortham Lane.

8.8 It should also be note that the Lens 2 assessment considers the cumulative impact of the schemes identified in **Figure 8.2**, rather than the Emerging Preferred Strategy. No data has been provided with regards to the impacts of the individual sites.

Traffic Impact – Network

8.9 The network impact of Lens 2 is summarised in **Table 8.1**.

Table 8.1: Lens 2 Impacts

	AM			Inter Peak			PM Peak		
	DM	Lens 2	% Change	DM	Lens 2	% Change	DM	Lens 2	% Change
Total PCU	220067	222824	1.3%	182604	184818	1.2%	219676	222465	1.3%
Total Travel Time (PCU hrs)	141630	142885	0.9%	100984	101562	0.6%	139850	141154	0.9%
Travel Distance (pcu - kms)	7894026	7917036	0.3%	6716937	6732260	0.2%	7829401	7849137	0.3%
Average Speed (km/h)	55.7	55.4	-0.5%	66.5	66.3	-0.3%	56	55.6	-0.7%
Average Delay (mins / PCU)	8.55	8.64	1.1%	3.83	3.86	0.8%	8.5	8.62	1.4%
Average Trip Length (KM)	35.87	35.53	-0.9%	36.78	36.46	-0.9%	35.64	35.28	-1.0%

8.10 There is very little impact reported on the overall network. In the AM peak there is an increase in average delay of 1.1% in the AM peak, 0.8% in the Inter Peak and 1.4% in the PM peak. This equates to on average increase in journey time of around 5 seconds in the AM peak, 2 seconds in the inter peak and 7.2 seconds in the PM peak. This level of change is minimal and would not constitute a severe impact in the context of overall network performance.

Traffic Impact – Traffic Numbers

8.11 **Figure 8.3** and **Figure 8.4** summarises the changes in traffic flows for the AM and PM peaks respectively.

Figure 8.3: Lens 2 Impact on Traffic Flows (AM)

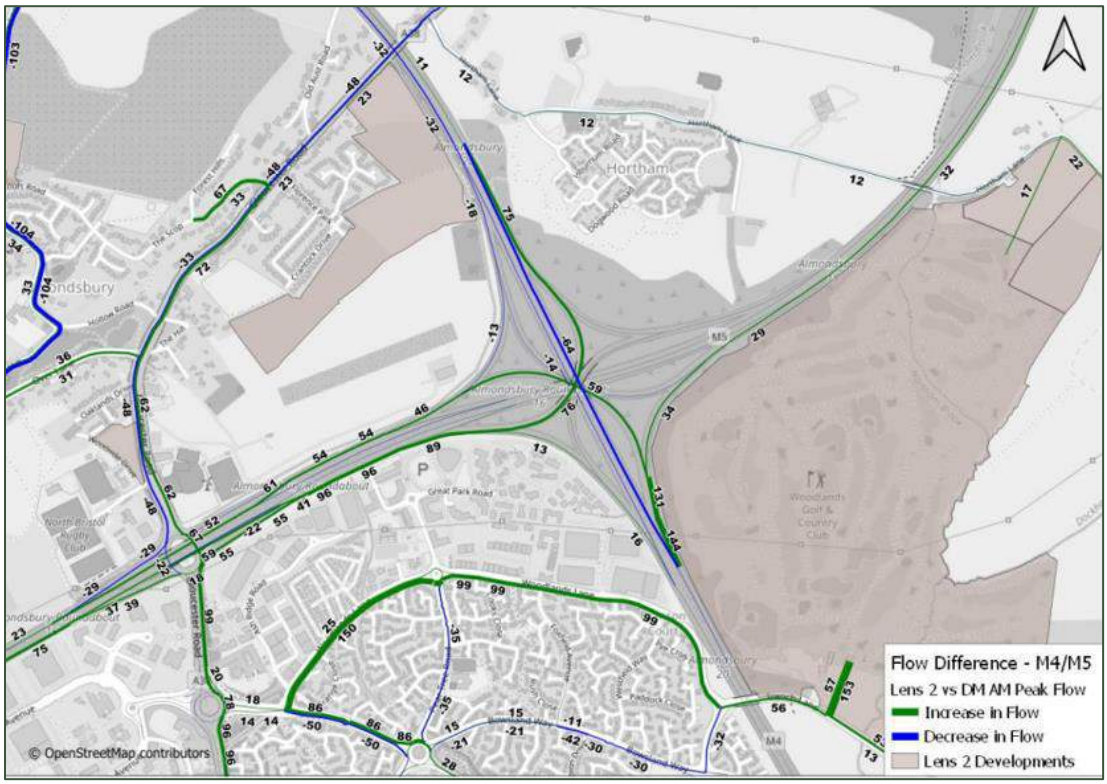
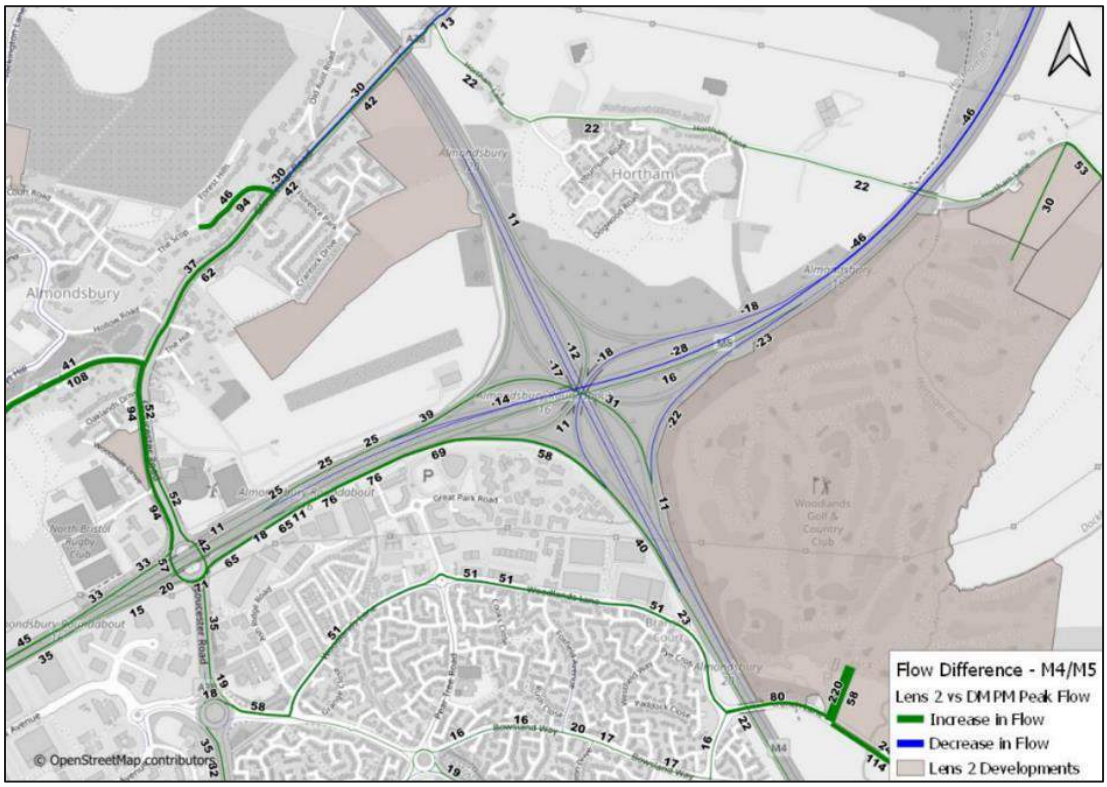


Figure 8.4: Lens 2 Impact on Traffic Flows (PM)



8.12 As shows in **Figure 8.3 and Figure 8.4**, traffic flow changes are relatively minor. The highest flow increases are on Woodlands Lane, Bradley Stoke Way and M5 junction 16.

Traffic Impact – Delay

8.13 **Figure 8.5** and **Figure 8.6** sets out the associated delay with the Lens 2 assessment.

Figure 8.5: AM Delay (Lens 2 v DM)

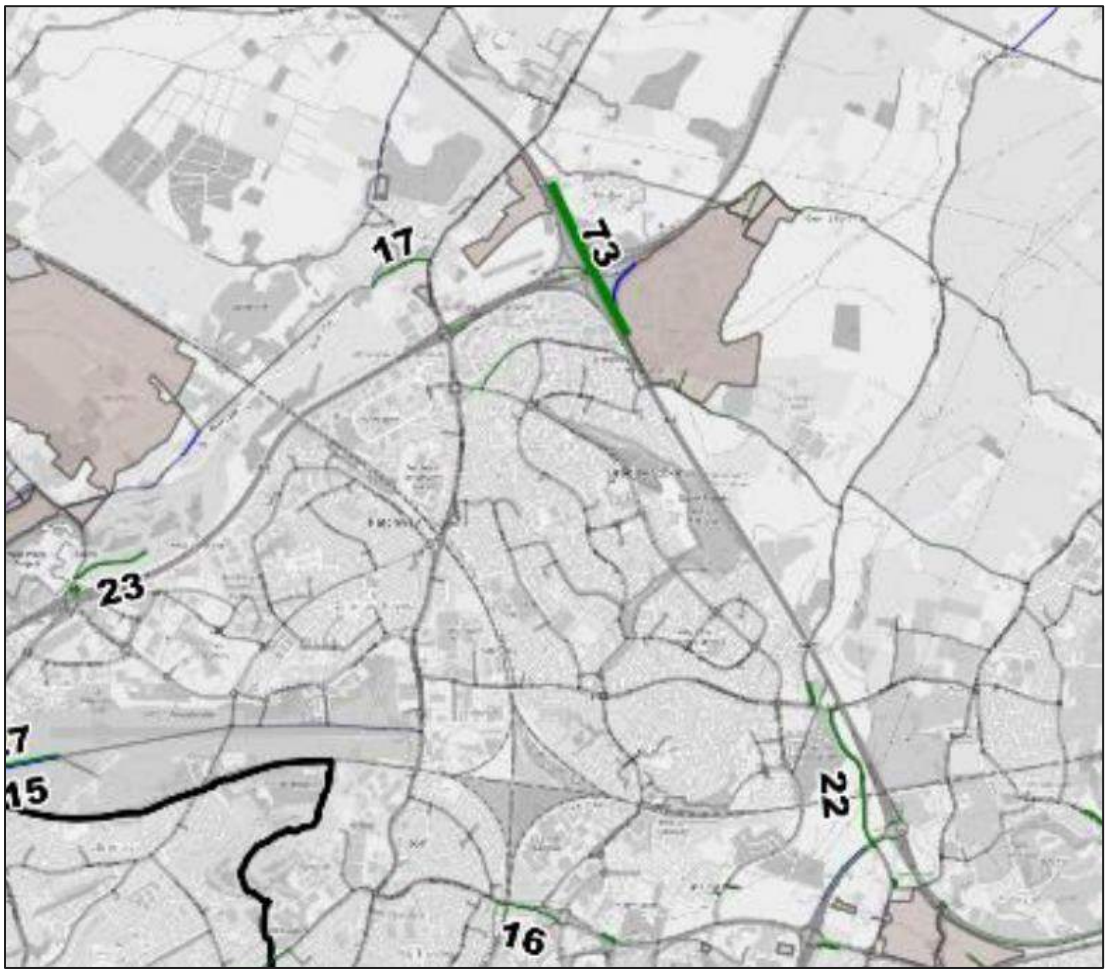
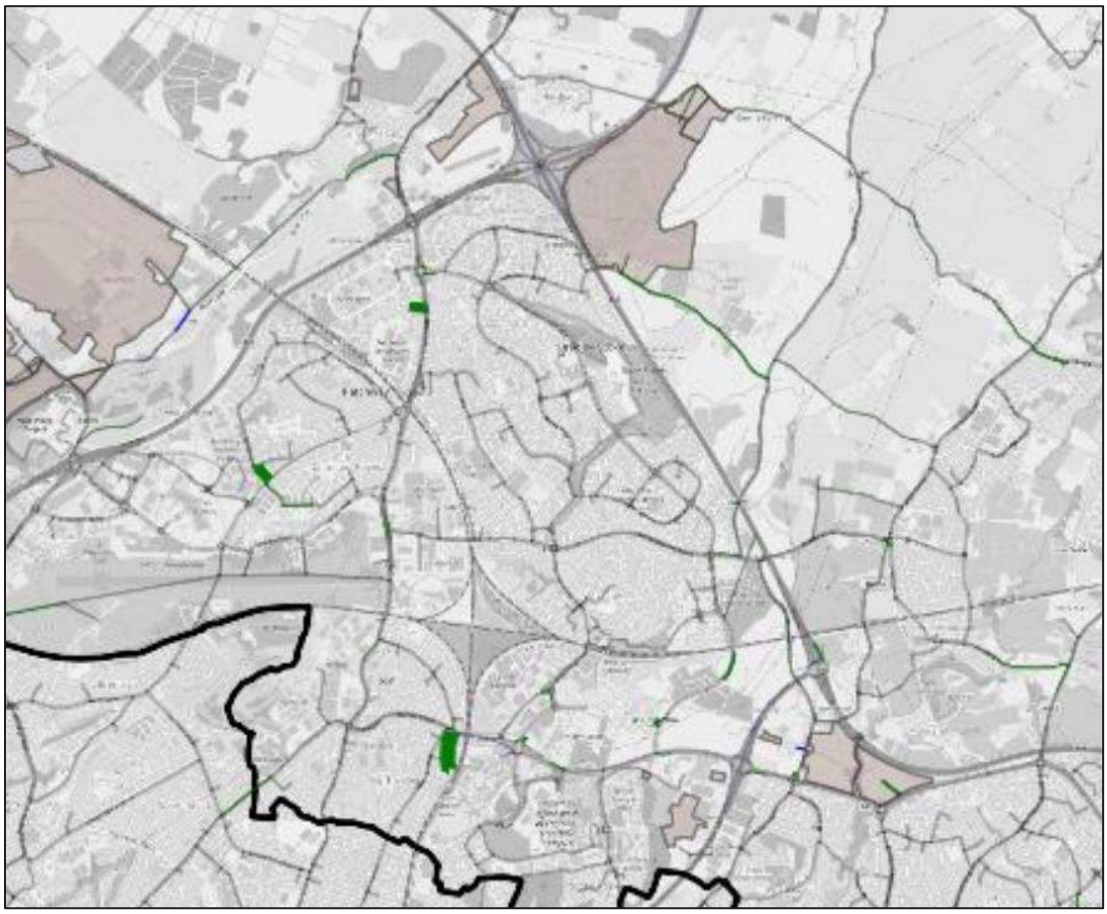


Figure 8.6: PM Delay (Lens 2 v DM)



8.14 As shown in **Figures 8.5 and 8.6,** the modelling work suggest that the impact of the Lens 2 sites has minimal impact on delay across the network, in particular on Woodlands Lane, Bradley Stoke Way and M5 Junction 16, where there the model forecasts an increase in traffic. The Preferred Strategy does not include all Lens 2 sites on the north fringe of Bristol and the potential impact of the Preferred Strategy could be even less than that reported in the Lens 2 assessment.

8.15 For the AM peak, it appears that there is an increased delay of 73 seconds at the M4 eastbound mainline however this should be further investigation as the traffic data suggest a reduction in traffic on this part of the network. No other notable changes are reported.

Bus and Rail Patronage

8.16 The model shows that there is an increase in bus patronage along the A38 however there is a reduction in bus patronage along Woodlands Lane which is the closest bus route to the development site.

8.17 We have engaged with Frist Bus who have suggested that there is potential scope for the T1 bus service to be routed through the site. Frist Bus suggested that if funding is made available for an extra bus, then the T1 could operate on 30-minute frequency between Thornbury and Bristol City Centre via Almondsbury (as per the existing route) and a 30-minute frequency between Thornbury and Bristol City Centre via Woodlands. This is subject to further assessment. Details are provided in Section 5.

Summary and Next Steps

8.18 In summary

- The modelling work presented in the Stage 1 Modelling Outputs Report was published in January 2024 generally shows that the impact of Lens 2 is relatively minor.
- There is no notable increase in delay on the local road network or at M5 Junction 16.
- The modelling does not provided details of the impact of the individual allocations. It only includes a cumulative assessment of all sites. We will engage with SGC to progress detailed modelling if the impact of Woodlands Garden Community.
- In the context of the area within close proximity to Woodlands Garden Community, there is an increase in trips along Woodlands Lane and M5 Junction 16. It is suggested that further assessment of the Woodlands site in isolation is required to understand the impact of Woodlands on the network.
- Bus patronage is forecast to reduce along the bus routes closest to the development. We have engaged with First bus show have suggested how bus provision could serve the Woodlands Garden Community.

8.19 Whilst at this stage it is unclear the extent of additional mitigations that is needed, SWSD's objective is to work collaboratively with the Council to identify a suite of transport measures that encourage and promote more walking and cycling particularly in relation to shorter and more regular local trips. Whist the exact need for improvements and appropriate mitigation measures on the wider network have yet to be addressed Woodlands Garden Community and the level of contribution required, we propose the following additional work:

- Agree detailed modelling of the Woodlands site with SGC. A scoping note has been issued to SGC;
- Discuss with SGC potential active travel enhancements between the site and key destinations including Aztec West, Cribbs Causeway and Bristol Parkway Station;
- Enhance access to the Metro Bus network, which is to be discussed with SGC, however this could include enhanced cycle parking provision at the Metro bus stops and possible improved access to scooter/e-bike schemes to enhance the link between the site and bus stop; and

- Further dialogue with First Bus with regards to enhanced bus provision for Woodlands Garden Community that includes improved level and frequency of service along with discounted travel tickets initiatives.

9.0 Summary

9.1 SLR Consulting Limited has been appointed by SWSD to provide Transport Planning advice with regards to the promotion of the Woodlands Garden Community site through the South Gloucestershire Council (SGC) new Local Plan (2040). An illustrative masterplan is provided at **Appendix A.**

9.2 The site (allocation Code: EPS-FC14) is identified within the *New Local Plan Phase 3 Towards a preferred strategy (Consultation document 2023)* for a residential development including a primary school and local centre. The Emerging Preferred Strategy suggests the site could deliver 800 homes in the plan period and a further 950 dwellings beyond the plan period.

9.3 The Lens 2 assessment shows the Woodlands Garden Community site (Site L2-FC2) delivering 875 homes in the plan period and 880 homes beyond the plan period, with two adjoining sites (Site L2-SV2 and L2-SV3) delivering 295 dwellings in the plan period.

9.4 As the Preferred Strategy does not identify the two adjacent sites for delivery in the plan period, we are of the view that the Lens 2 assessment of a total of 1,170 dwellings (at Woodlands Garden Community and the two adjacent sites) should and can be delivered at Woodlands Garden Community in the plan period.

9.5 Two adjacent sites (EPS-SV5 and EPS-SV7) to Woodlands Garden Community are also included in the Emerging Preferred Strategy but these will deliver up to 280 beyond the plan period.

9.6 For clarity this document promotes site EPS-FC14 only.

9.7 As part of the analysis work included within the *New Local Plan Phase 3 Towards a preferred strategy (Consultation document 2023),* 3 lenses are considered (L1: Local Plan with no Green Belt Loss, L2: Local Plan Urban Edge, L3: Majority of new homes provided along already established key public transport routes and hubs).

9.8 The Woodlands Garden Community site is included as part of the Lens 2 assessment, and the development assumption is different to that identified in the Emerging Preferred Strategy. The Lens 2 assessment shows the Woodlands Garden Community site (Site L2-FC2) delivering 875 homes in the plan period and 880 homes beyond the plan period, with the two adjoining sites (Site L2-SV2 and L2-SV3) delivering 295 dwellings in the plan period.

9.9 The *New Local Plan Phase 3 Towards a preferred strategy (Consultation document 2023)* states that the Woodlands Garden Community site could deliver 800 homes during the plan period, whilst the Lens 2 assessment assumed 875 homes deliver in the plan period at Woodlands Garden Community.



9.10 In respect of the two sites off Gaunts Earthcott Lane (EPS-SV5 and APS-SV7), the *New Local Plan Phase 3 Towards a preferred strategy (Consultation document 2023)* states that no dwellings will be delivered during the local plan period. However, the Lens 2 assessment states that two sites off Gaunts Earthcott Lane (L2-SV2 and L2-SV3) could deliver 108 a(L2-SV3) and 187 (L2-SV2) dwellings respectively during the local plan period.

9.11 We are of the view that the two sites off Gaunts Earthcott Lane (EPS-SV5 and APS-SV7) are reliant on the Woodlands Garden Community site (L2-FC2 (EPS-FC14) coming forward first in order for the sites off Gaunts Earthcott Lane to be considered to be accessible. In the event that the two sites off Gaunts Earthcott Lane (L2-SV2 and L2-SV3) were to be delivered in isolation then access (vehicle and sustainable access) would be directly from Hortham Lane. There is no footpath provision for around 1km between the two sites off Gaunts Earthcott Lane and the built-up area of Hortham. A less direct route would be also needed to access facilities at Aztec West, Cribbs Causeway, and local Rail stations. The travel distance to Aztec West from the two sites off Gaunts Earthcott Lane (L2-SV2 and L2-SV3) would be at least 750m longer than if those trips were routed through Woodlands Garden Community and which would connect to Woodlands Lane via a new active travel bridge over the M4.

9.12 As such we are of the view that the 1,170 dwellings identified for delivery in the Lens 2 assessment should all be included within the Woodlands Garden Community site, with houses delivered on the two sites off Gaunts Earthcott Lane to be delivered beyond the plan period.

9.13 The Stage 1 Modelling Outputs Report was published in January 2024 confirms that the traffic impact of the Lens 2 assessment (including the 1,170 at Woodlands) is limited and does not suggest a severe impact on the road network. Notwithstanding the above, SWSD is committed to working collaboratively with SGC to undertake detailed modelling and to understand the impact of the Woodlands Garden Community site in isolation. A scope of the assessment is currently being agreed with SGC.

9.14 This document confirms that the site is located in a highly accessible location and is suitably located to provide the opportunity to encourage trips by sustainable modes. The site is located within active travel distances of key areas including Aztec West, Cribbs Causeway, UWE, Filton, and Bristol Parkway Rail Station which provide significant employment retail, education, health, and leisure facilities. Future residents could make us of the existing walking and cycling infrastructure that can be used to access these areas.

9.15 Bus routes are located nearby which provides connections to the areas identified above as well as Bristol City Centre, however we have engaged with the network operator and it has been suggested by First Bus that the T1 service could route through the site whilst also serving its existing route. Further discussion and analysis are required, and we will work with First Bus and SGC to further develop a bus strategy the site.

9.16 Bristol Parkway rail station is located within a comfortable cycle ride from the site which provides frequent services to Bristol, Cardiff, Reading, and London. Access is also available to Patchway station which is slightly closer to the site than Parkway, but operates with a lower level of service.

9.17 This report identifies the following key areas of enhancement that should be considered further:

- Provision of Active Travel Bridge between the site and Woodlands Lane to the west;
- Provision of an Active Travel Link connecting the Trench Lane Roundabout with off-site cycle links (including Concorde Way);
- Review of existing off site cycle links and potential enhancements to these links; and
- Enhance cycle parking facilities at the Metrobus stops on Bradley Stoke Way.

9.18 The Stage 1 Modelling Outputs Report (SGC) was published in January 2024 and does not suggest any notable traffic issues.

9.19 To conclude the allocation of the Woodlands Garden Community will enable the Local Plan to deliver new houses in a highly accessible location which is within active travel distance of significant services and facilities, in this case, Aztec West, Cribbs Causeway, UWE, Filton and Bristol Parkway Rail Station. The scheme could deliver enhancement to active travel and public transport provision in the area which will to only benefit future residents of Woodlands Garden Community but also residents and employees in the surrounding areas.

9.20 We look forward to working with SGC's transport officers to further develop the scheme and in particular the mitigation measures that will ensure the Woodlands Garden Community (WGC) maximises the benefits of its enviable location.

Appendix A Illustrative Masterplan

Woodlands Garden Community

Regulation 18 Transport Submission

SWSD

SLR Project No.: 416.065105/00001

15 February 2024



Masterplan Strategy

Access

1. Main access to the site from Trench Lane and from Gaunt's Earthcott Lane, creating a new strategic urban connection which is well enclosed by development.
2. Secondary or emergency access possible from Trench Lane
3. Public Right of Way (pedestrian route) within across the site retained within a green infrastructure (GI) corridor and serving to connect the existing and new communities towards strategic footpath networks to the north of the site.
4. New on-site pedestrian routes utitise existing shingle trails associated with the golf course and provide circular walks and leisure routes
5. A hierarchy of streets creates a legible residential environment. This includes main and secondary streets, shared surface areas and loops within development parcels, creating a highly accessible environment.
6. Buildings address POS with shared space / private drive frontage to promote quiet streets. All green spaces have frontages overlooking them to provide natural surveillance

1:1,2500

0 100 200m

Landscape

7. Joined up GI network including formal and informal recreation areas, childrens' play, allotments and ecological areas / SUDS. A number of circular walks are available within the GI network.
8. Historic filed boundaries, some still incorporating planting, have been retained to create additional green infrastructure corridors or avenues within the development with reference to local landscape character and ecological habitat/connectivity.
9. A dense landscape edge is proposed to the northern and eastern boundaries based on existing and enhanced planting. This boundary includes hedgerow planting with trees and a shared pedestrian/cycle path.
10. The built form to the northern site boundary redefines the urban edge. Existing hedge planting is proposed to be enhanced with trees, to help integrate development and allow filtered views into/out of the site.
11. Linear habitat creation is intended through the site, in association with the proposed road infrastructure/ drainage features/watercourse/retained hedgerows.
12. The potential to upgrade existing cycle and pedestrian infrastructure immediately adjacent to the site boundaries

Community

13. Two-form entry primary school close to development focus the centre of the site.
14. Potential Local Centre located centrally;
15. Public Open Space includes allotments as well as equipped childrens' play areas.
16. Proposed Commuter cycle route including on and off road sections within the development and providing a strategic connection to Bradley Stoke

client:
South West Strategic Developments

project:
Woodlands

drawing title:
Concept Masterplan

job number: **SWS103**
drawing number: **3207 draft**
scale: **1:2500 @ A1**
drawn: **jvs**
date: **October 2020**
status: **Preliminary**

urbandesignbox.co.uk

Copyright of Urban Design Box. This drawing is for illustrative purposes only and should not be used for any construction or estimation purposes. No liability or responsibility is accepted arising from reliance upon the information contained within this drawing. DO NOT SCALE DRAWINGS.

Urban Design Box

Appendix B Access Design Drawings

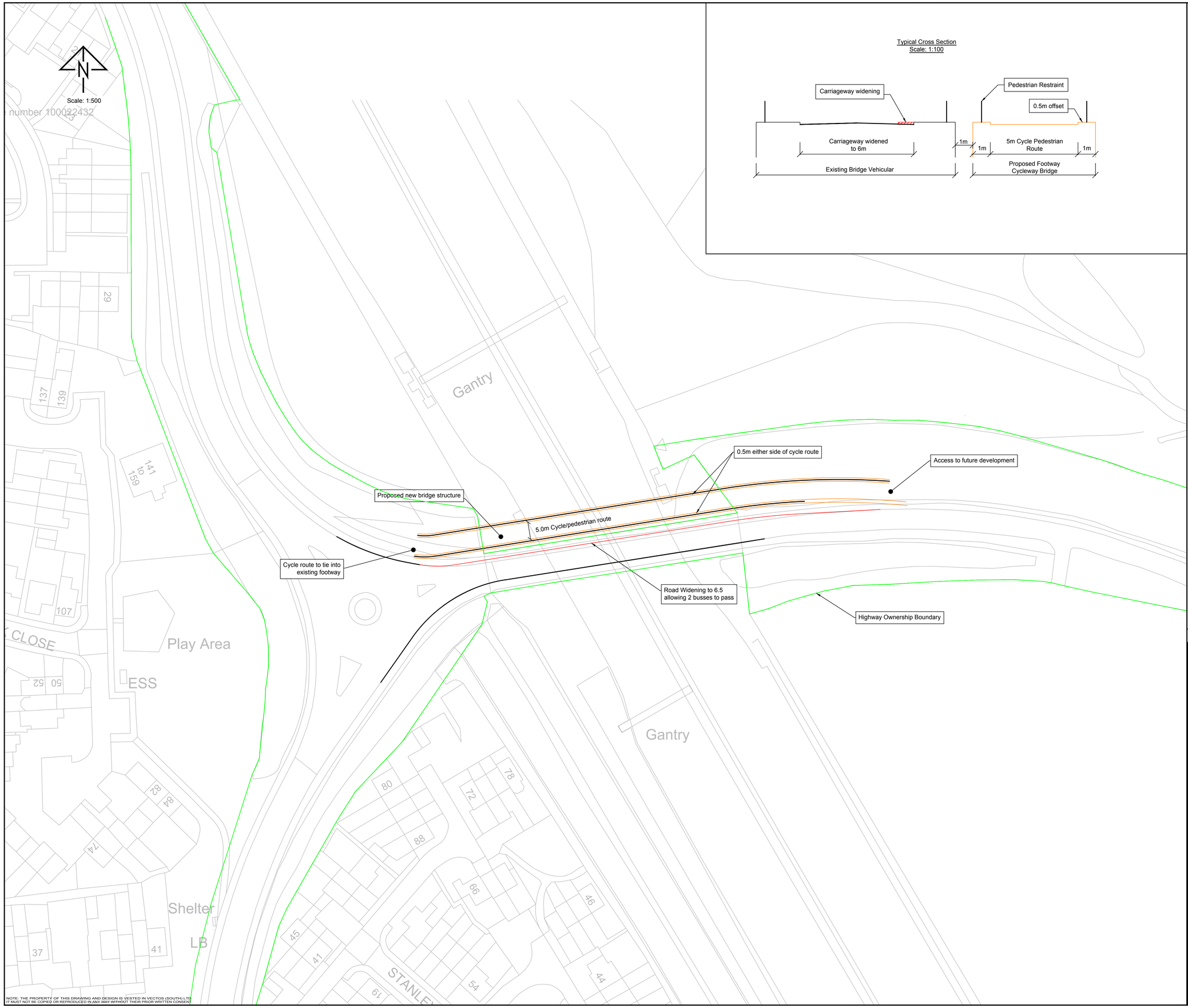
Woodlands Garden Community

Regulation 18 Transport Submission

SWSD

SLR Project No.: 416.065105/00001

15 February 2024



NOTE: THE PROPERTY OF THIS DRAWING AND DESIGN IS VESTED IN VECTOS (SOUTH) LTD. IT MUST NOT BE COPIED OR REPRODUCED IN ANY WAY WITHOUT THEIR PRIOR WRITTEN CONSENT.

REV.	DETAILS	DRAWN	CHECKED	DATE
-	-	-	-	-

STATUS: INFORMATION ONLY

CLIENT: Grass Roots Planning

PROJECT: Woodland Golf Course

DRAWING TITLE: Cycle Route & Carriageway Widening

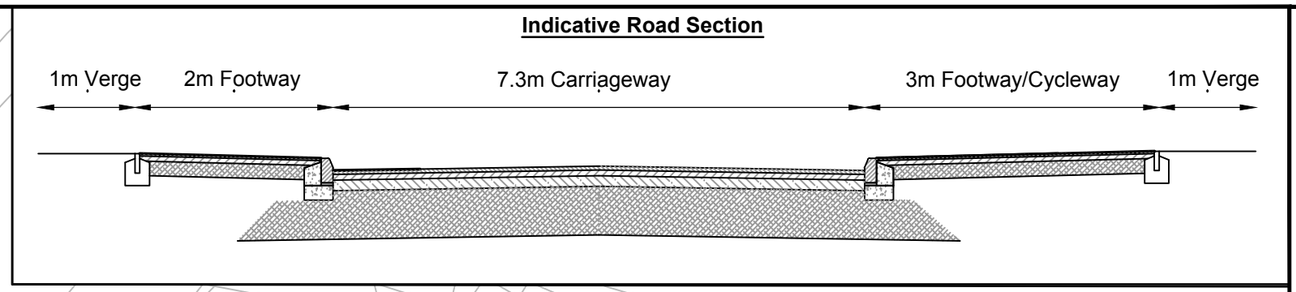
SCALES: AS SHOWN @ A1

DRAWN:	CHECKED:	DATE:
AB	AD	07/2017

vectos transport planning specialists
Broad Quay House, Prince Street, Bristol, BS1 4DJ
t: 0117 905 8888 e: enquiries@vectos.co.uk

DRAWING NUMBER: 162451-GA-01

REVISION: -



NOTE: THE PROPERTY OF THIS DRAWING AND DESIGN IS VESTED IN VECTOS (SOUTH) LTD.
IT MUST NOT BE COPIED OR REPRODUCED IN ANY WAY WITHOUT THEIR PRIOR WRITTEN CONSENT.

Note:
1. All dimensions based on OS Data
2. Land Ownership shown approximate for information only.
3. Speed limit reduced to 30mph.
4. Design based on DMRB standards
5. Levels based on Lidar data
6. Extent of visibility based on assumed horizon due to vertical curve of bridge, to be confirmed.
7. Level and extent of bettering and retaining wall is preliminary only and subject to further detail
8. Priority junction not suitable for significant traffic numbers

REV.	DETAILS	DRAWN	CHECKED	DATE
.	.	.	.	.

STATUS:
INFORMATION ONLY

CLIENT:
Grassroots Planning

PROJECT:
Woodland Golf Course

DRAWING TITLE:
Woodlands Secondary Access
Option 3 - Priority Junction

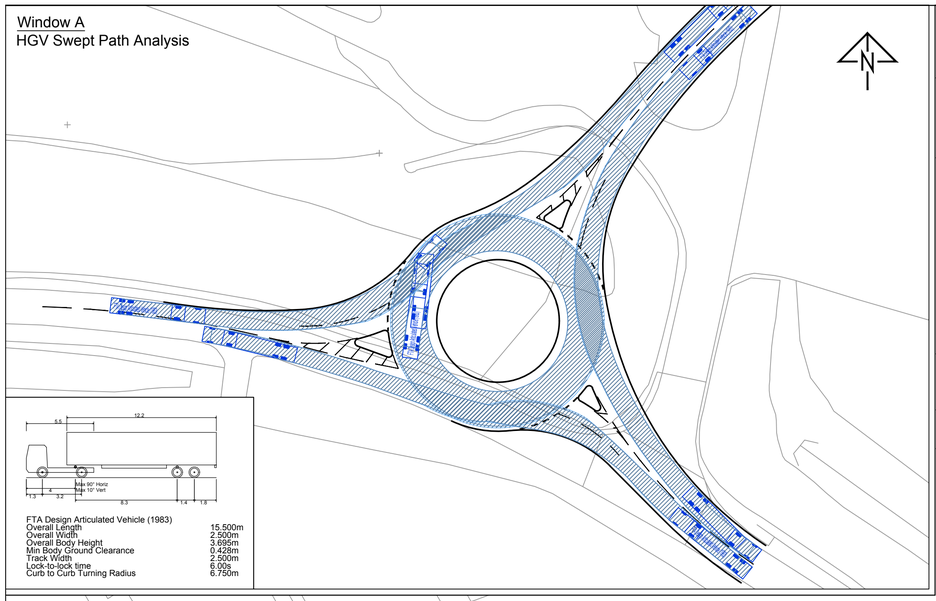
SCALES:
1:500 @ A3

DRAWN:	CHECKED:	DATE:
AB	AD	04/2017

vectos
transport planning specialists
Broad Quay House, Prince Street, Bristol, BS1 4DJ
t: 0117 905 8888 e: enquiries@vectos.co.uk

DRAWING NUMBER:	REVISION:
162451-PHL-03	-

Window A
HGV Swept Path Analysis



FTA Design Articulated Vehicle (1983)

Overall Length	15.500m
Overall Width	2.500m
Overall Body Height	3.695m
Min Body Ground Clearance	0.428m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	6.750m

General Arrangement Plan

Club House

Gantry

TRENCH LANE

80
72
78
88
66
46

Approach half width (m)	3.65
Entry width (m)	7.00
Effective flare length (m)	13.00
Deflection (radii (m))	71
Entry angle (degrees)	33

Approach half width (m)	3.65
Entry width (m)	7.06
Effective flare length (m)	9.53
Deflection (radii (m))	100
Entry angle (degrees)	35

Approach half width (m)	3.65
Entry width (m)	6.39
Effective flare length (m)	6.93
Deflection (radii (m))	100
Entry angle (degrees)	37

Forward visibility at entry

R25

R30

Ø36

R20

160m forward visibility splay, in accordance with DMRB guidance for a national speed limit

Existing accesses to be maintained

NOTE: THE PROPERTY OF THIS DRAWING AND DESIGN IS VESTED IN VECTOS (SOUTH) LTD. IT MUST NOT BE COPIED OR REPRODUCED IN ANY WAY WITHOUT THEIR PRIOR WRITTEN CONSENT.

REV.	DETAILS	DRAWN	CHECKED	DATE
.	.	.	.	.

STATUS: INFORMATION ONLY

Notes

1. All information is indicative only and subject to change at a later stage.

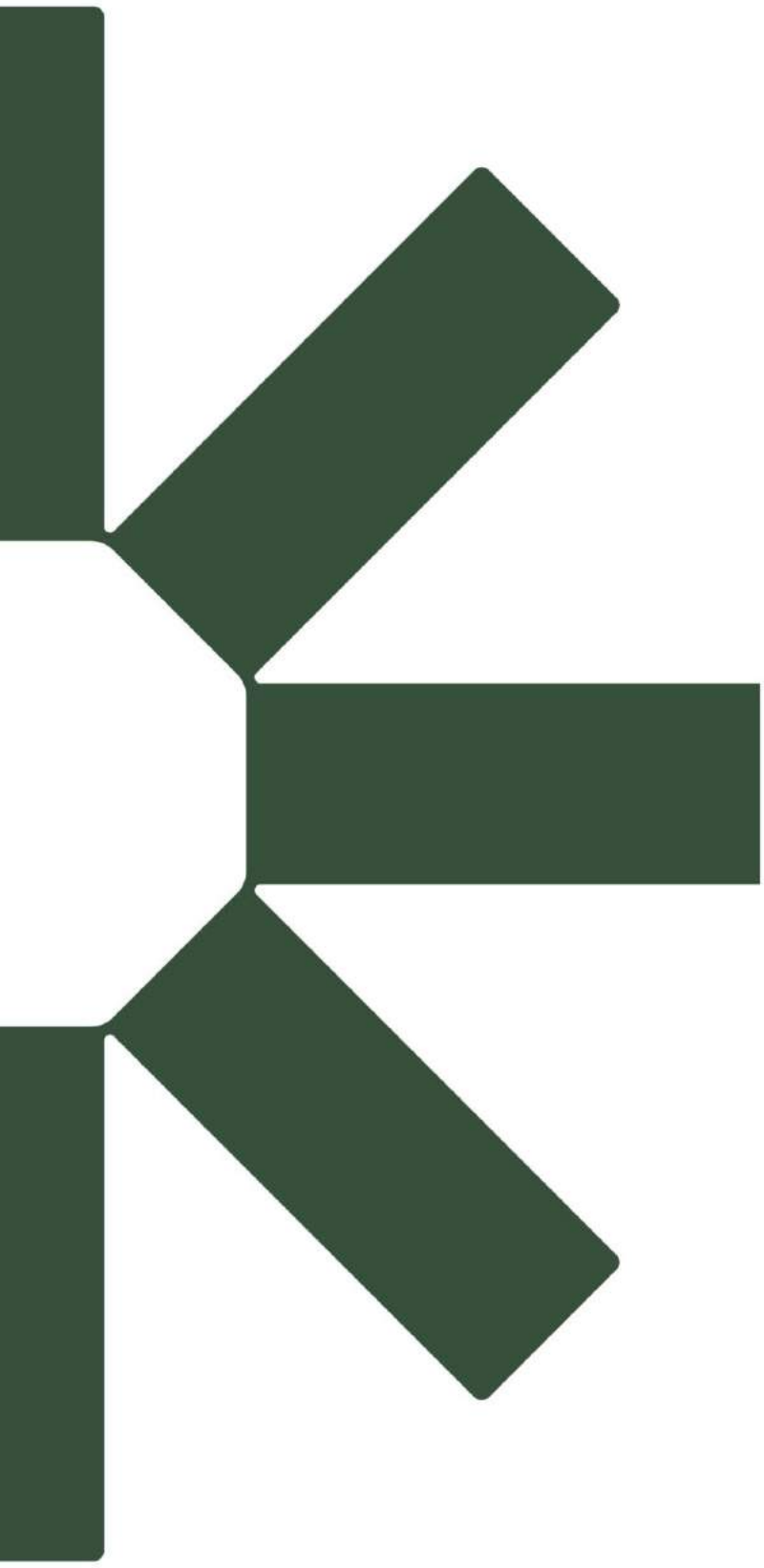
PROJECT: Woodland Golf Course

CLIENT: Grassroots Planning

DRAWING TITLE: Southern Access Arrangement Option 1

vectos transport planning specialists
Broad Quay House, Prince Street, Bristol, BS1 4DJ
t: 0117 905 8888 e: enquiries@vectos.co.uk

DRAWN:	CHECKED:	DATE:	SCALES:	DRAWING NUMBER:	REVISION:
JH	JH	03/07/2017	1:500 @ A1	162451_PHL_06	-



Making Sustainability Happen

Appendix 2 – FRA/Drainage Report

SLR Consulting Limited

South West Strategic Developments

Written Representations – Flood Risk and Drainage Addendum

SLR Project No.: 416.065193.00001

1 February 2024

Revision: 02

RE: LAND AT WOODLANDS GOLF CLUB

1.0 Introduction

1.1 In December 2016, Vectos (South) Ltd (now SLR Consulting Ltd), prepared written representations for the residential development aspirations for Land at Woodlands Golf Course, Bristol.

1.2 Following the publication of the 'Preferred Options' Local Plan document by South Gloucestershire Council in which the site has been selected as an emerging allocation, it is understood that some additional items for consideration have been set out, beyond what was discussed within the original representations. It was noted that:

"*It is likely a solution will be required for the entrance to L2-FC2 Woodlands due to targeted higher flood zones at Trench Lane and Hortham Lane"*.

1.3 It is the purpose of this addendum to provide further information on this regard.

2.0 Trench Lane Access

2.1 The access at Trench Lane is in Flood Zone 1; this is associated with a low flood risk from rivers and the sea. A localised area of surface water flooding is evident on site just to the north of where the access joins Trench Lane.

2.2 Once developed, surface water runoff will be managed using Sustainable Drainage Systems (SuDS). This means that localised areas of surface water flooding will largely disappear. However, it may be necessary to provide a small culvert beneath the access road to allow surface water runoff from landscaped areas to drain beneath it and into Hortham Brook.

2.3 These measures will help to ensure that vehicular access is available from and to the wider highway network during extreme flood conditions.

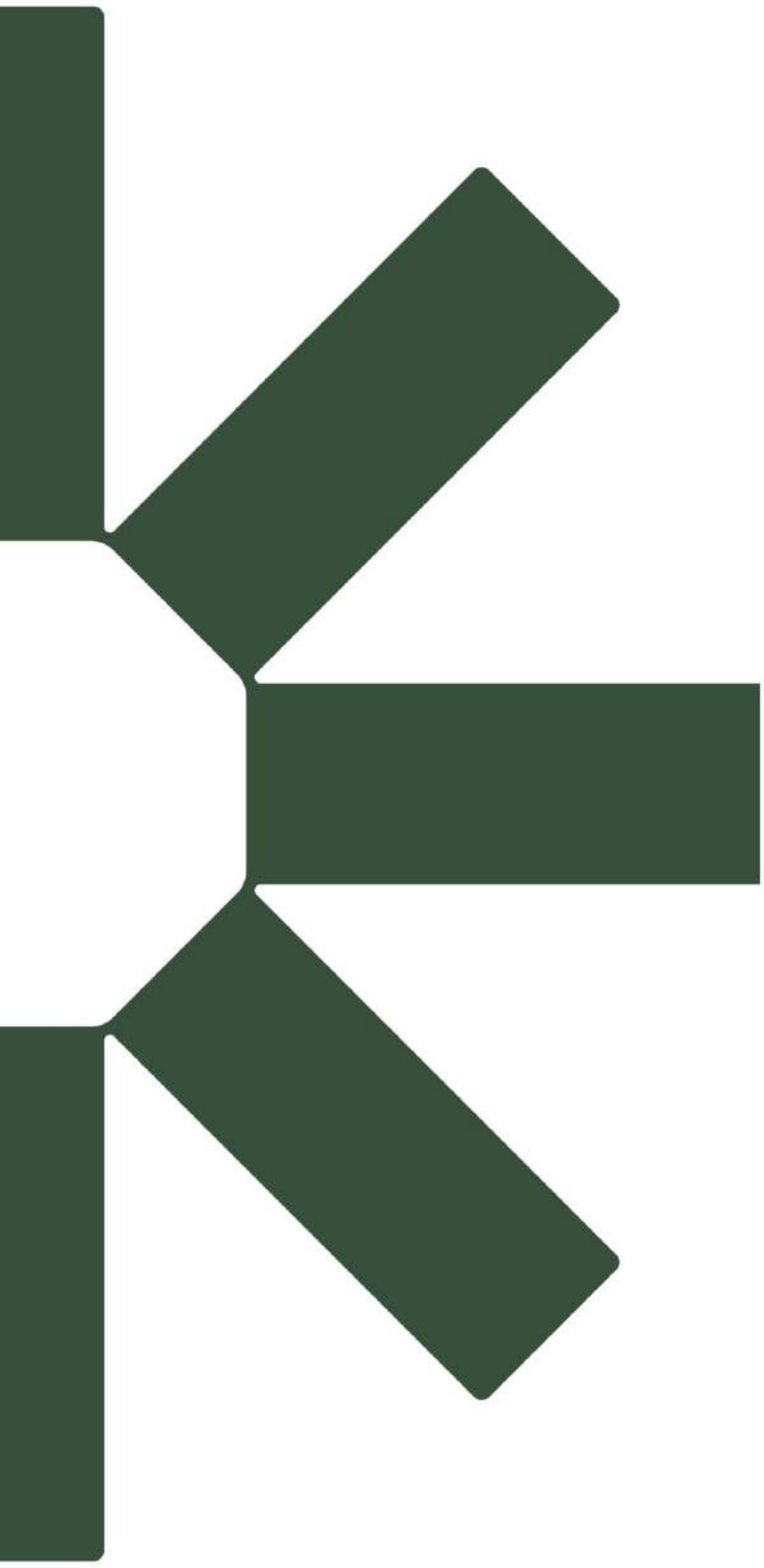
3.0 Hortham Lane Access

3.1 The potential access at Hortham Lane is shown to cross an area of Flood Zone 3; this is associated with a high flood risk from Hortham Brook.

3.2 Hortham Lane is elevated above the floodplain. Therefore, the access road will be raised to join this elevated position. This will ensure that vehicular access is available from and to the wider highway network during extreme flood conditions. However, raising of land in Flood Zone 3 can result in the displacement of floodwater, which can in turn have an adverse impact on third parties. This is not compliant with national or local planning policy. Therefore, the access road proposals will be subject to hydraulic modelling and if an adverse impact is identified, this is likely to be subject to floodplain compensation to mitigate this risk.

4.0 Conclusion

4.1 Through further investigative and/or engineering works as part of the planning submission, it can be concluded that vehicular access is likely to be available from and to the wider highway network during extreme flood conditions from both Trench Lane and Hortham Lane.



Making Sustainability Happen

Appendix 3 – Heritage Report

Built Heritage Note.

Land at Woodland Golf Course (Local Plan Site ID: EPS-FC14)

On behalf of South West Strategic Developments.

Date: 13th February 2024 | Pegasus Ref: P24-0146

Author: Hannah Armstrong, BA(Hons) MSc IHBC ACIfA
Director

Document Management.

Version	Date	Author	Checked/ Approved by:	Reason for revision
1	07.02.2024	HA	AR	-
2	13.02.2024	HA	HA	Minor text edits.

Contents.

1. Introduction 1
2. The Built Historic Environment 3
3. Assessment of Potential Impact. 12
4. Summary Conclusions 15

Appendices contents.

Appendix 1: Methodology 17
Appendix 2: Site Photographs. 23

1. Introduction

1.1. This Built Heritage Note has been prepared by on behalf of South West Strategic Developments in relation to the development of Woodland Golf Course, as currently being considered via the South Gloucestershire Local Plan (Site ID: EPS-FC14). The redline for Site ID: EPS-FC14 (henceforth referred to as 'the Site') is provided at Plate 1, with the area being promoted for mixed residential and commercial use.

1.2. The Site comprises the existing Woodland Golf Course complex, and is bound by the M4 and M5 motorways to the west and north respectively, Trench Lane to the south and open fields to the east and northeast. The majority of the Site comprises the main golf course complex and a fishing lake, the landform, topography and character of which is man-made. The club house and associated car park is located in the southern part of the Site. In general, the character and appearance of the Site is one of a modern, man-made landscape, with the two motorways beyond the Site visible and audible, and modern development beyond.

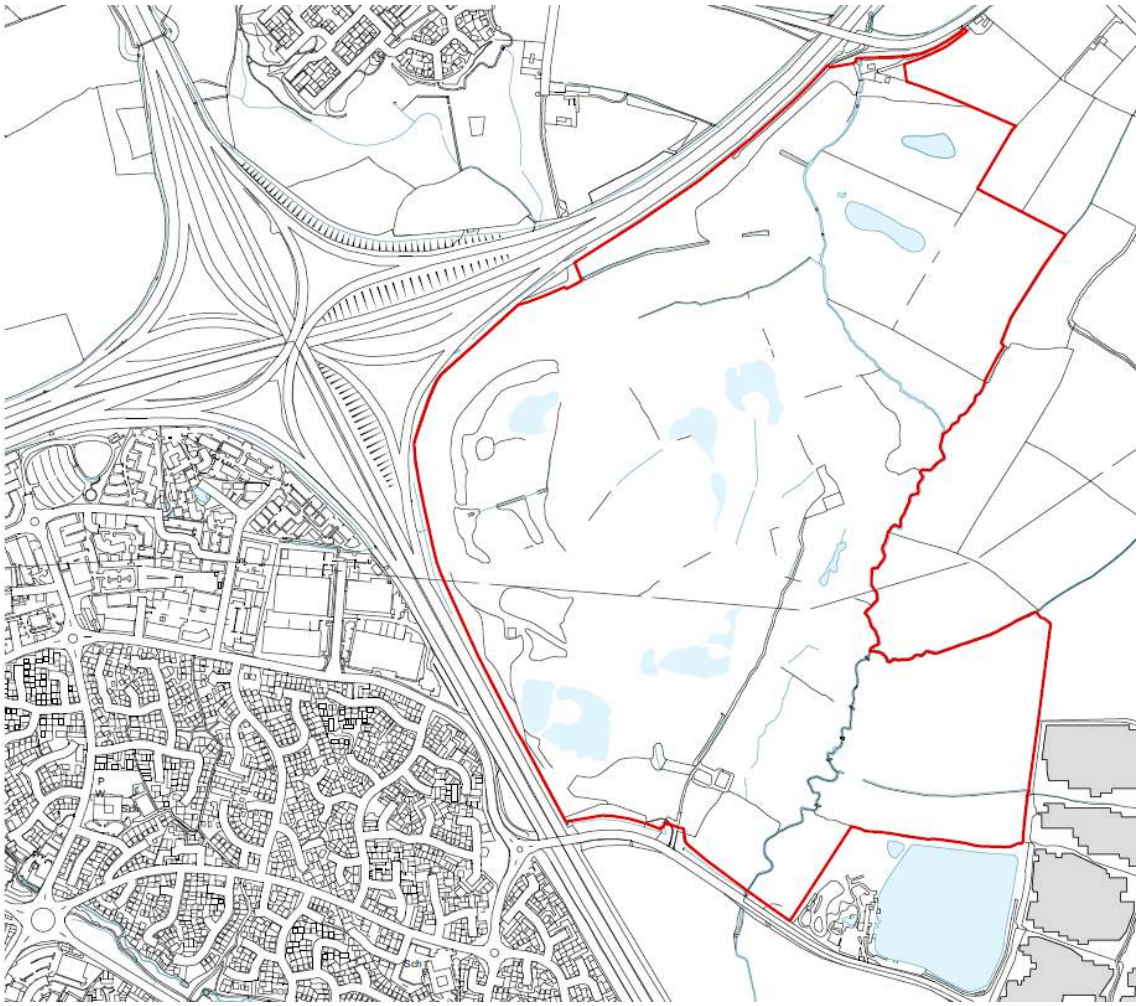


Plate 1: Site location plan.

1.3. This Note considers the following key points, the aim of which is to inform how potential impacts on the built historic environment should be considered within the allocation process:

- The identification of built heritage assets that have the potential to be sensitive to the redevelopment of the Site.
- An assessment of the contribution made by the Site to such significance via 'setting', as applicable.
- An assessment of the potential impact of the redevelopment of the Site 'in principle' to the heritage significance of relevant heritage assets.
- An assessment of potential impact of the emerging masterplan to the heritage significance of relevant heritage assets.
- A summary of potential impacts and how these should be viewed in the planning process.

1.4. The level of information provided is proportionate to the context in which the Site is currently being considered, and is prepared in the context that any future planning application would be accompanied by a detailed Heritage Statement addressing both built heritage and below ground archaeology, as applicable. The Methodology utilised in the preparation of this Note detailed at **Appendix 1**.

1.5. A selection of photographs which help to illustrate the discussions in **Section 2** are included at **Appendix 2**. The photographs are not accurate visual representations of the site or development proposals, nor do they conform to any standard or guidance i.e., the Landscape Institute Technical Guidance Note 06/19. However, the photographs included are intended to be an honest representation and are taken without the use of a zoom lens or edited, unless stated in the description or caption.

2. The Built Historic Environment

2.1. There are no built heritage assets, designated or non-designated, located within the bounds of the Site.

2.2. Step 1 of the methodology recommended by *GPA3* (see methodology), is to identify which heritage assets might be affected by a proposed development.[1] Development proposals may adversely impact heritage assets where they remove a feature which contributes to the significance of a heritage asset, or where they interfere with an element of a heritage asset's setting which contributes to its significance, such as interrupting a key relationship or a designed view.

2.3. The high-level site appraisal prepared by South Gloucestershire Council in relation to the Site identifies the group of designated heritage assets at Gaunt's Earthcott to the northeast as having the potential to be sensitive to the redevelopment of the Site, with these comprising the:

- Group of heritage assets at Manor Farm, comprising the Grade II* Listed Manor Farmhouse, Grade II Listed Wall and non-designated Local Historic Park and Garden, located *c.*400m northeast of the Site at its closest point.
- Grade II Listed Court Farm Farmhouse, located *c.*545m northeast of the Site.
- Grade II Listed Green Farm Farmhouse, located *c.*580m northeast of the Site.

2.4. These assets are thus considered further below, with their location detailed at Plate 2. List Entries for the designated heritage assets are included at **Appendix 3**.

2.5. The three aforementioned farmsteads, alongside later detached dwellings, form the settlement of Gaunt's Earthcott, a dispersed hamlet situated within the parish of Almondsbury.

2.6. Consideration, based upon professional judgement and on-site analysis, was made as to whether any of the additional built heritage assets present within the surrounding area may include the Site as part of their 'setting', whether the Site contributes to their overall heritage significance, and whether the assets may potentially be affected by the proposed scheme as a result.

2.7. This has concluded that the Site does not form part of 'setting' that positively contributes to overall heritage significance of any further built heritage assets due the nature of the asset and a lack of visual connections, spatial relationships or historic connections. This includes the group of designated and non-designated built heritage assets on the western side of Trench Lane *c.*600m+ east of the Site. Accordingly, the development of the Site is not anticipated to result in a change that would impact upon the overall heritage significance of other built heritage assets in the environs of the Site.

[1] Historic England, *GPA:3*, p. 4.

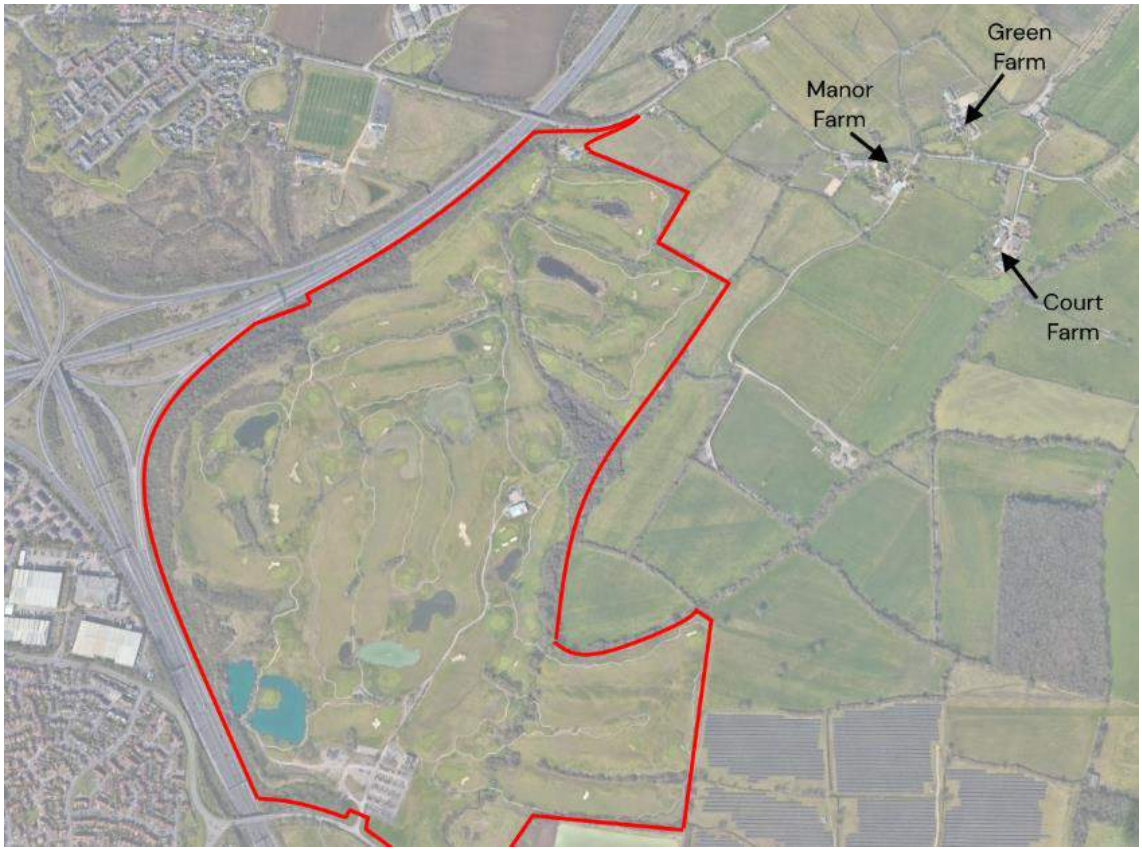


Plate 2: Aerial photograph detailing the Site (approximate boundary shown in red) in relation to the identified heritage assets.

Group of Heritage Assets at Manor Farm

2.8. The Grade II* Listed Manor Farm Farmhouse comprises a former medieval / post-medieval farmhouse with a 16th-century core, and later 17th, 19th and 20th-century alterations. The asset is set within a defined domestic garden on the southern side of Gaunt's Earthcott Lane. Located to the east of the farmhouse is a Grade II Listed 18th-century wall, incorporating gate piers and a mounting block.

2.9. The domestic gardens within which the above are sited are classified by South Gloucestershire Council as a 'Local Historic Park and Garden' (a non-designated heritage asset in the terms of the NPPF). The garden is a described on Know Your Place as a *'modern garden incorporating 17th-century features; 3 walled gardens; stone seats; sundial; modern planting in period'*. The northern part of the garden was clearly visible from the lane to the north at the date of survey, with observations concluding that the asset is of limited significance, at most.

2.10. Located to the south of the above group is the historic farmstead, the built form of which has been subject to residential conversion with further change arising from the construction of new dwellings and agricultural buildings in the 20th and 21st centuries. The current composition of the wider farmstead is much altered from the historic arrangement both in terms of form and character. Development now provides a notable physical and visual barrier between the farmhouse and the wider landscape to the south, with further

change associated with land use changes, i.e., a historic orchard to the south of the farm complex has been removed.

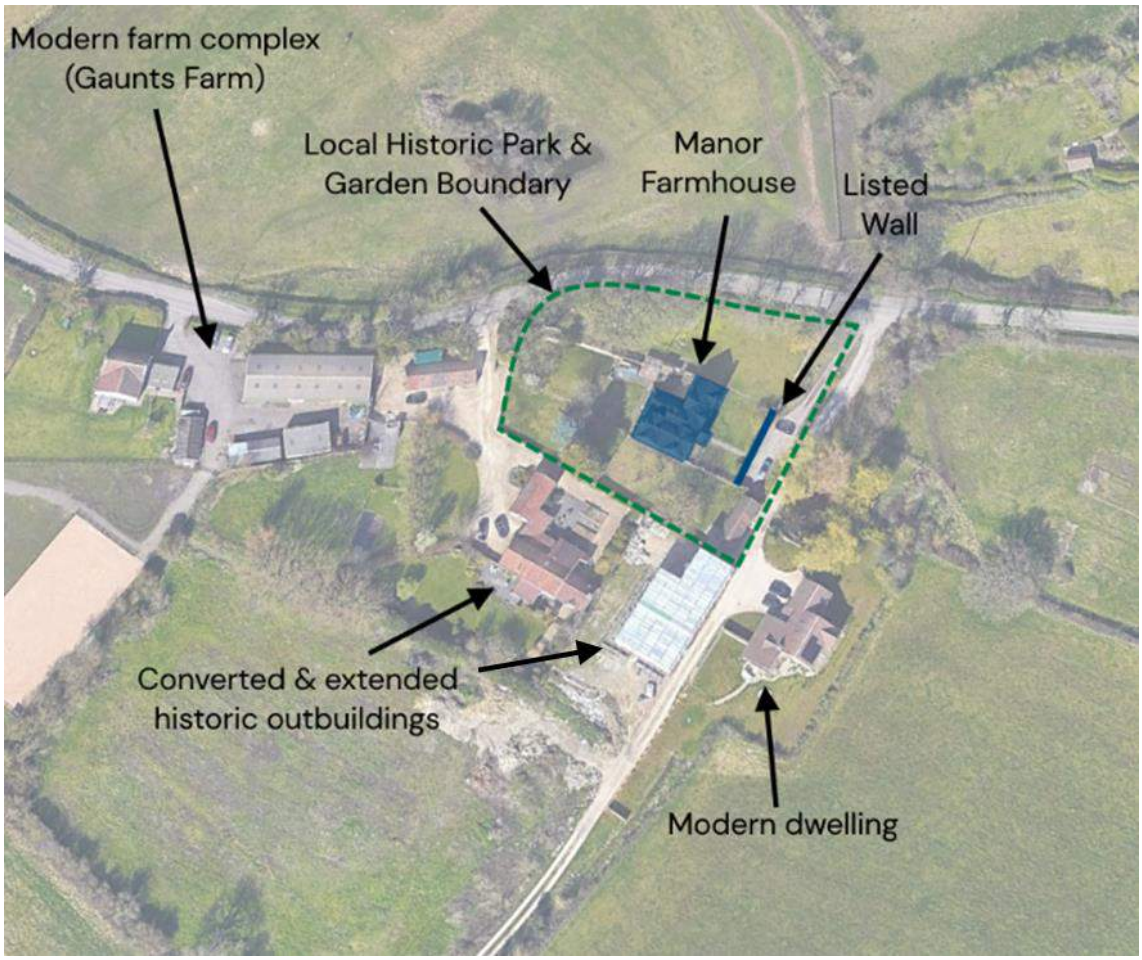


Plate 3: Aerial photograph detailing the assets at Manor Farm and other buildings within its immediate environs.

2.11. A review of archival sources has demonstrated that part of the Site historically formed part of the landholdings associated with the farmhouse, owned by Henry Bengough Esq. and tenanted by Jacob Thomas (see Plate 4). The remainder of the Site was also under the ownership of Bengough, but occupied by separate tenants and thus did not form part of the landholdings associated with Manor Farm, i.e., Bengough held a large estate which included a variety of farmsteads, and thus a functional connection did not exist between all aspects of Bengough's estate.

2.12. This historic functional connection is no longer clearly understood due to the changes which have occurred to the south of the farmhouse (as set out above) and within the Site in the 20th and 21st centuries. Specifically:

- The changes to the south of the farmhouse have impacted upon the spatial and visual relationship between the farmhouse and the former land holdings to the south.

- The development of Woodlands Golf Course has removed the agricultural character and field morphology of the former landholdings as historically located within the bounds of the Site.



Plate 4: Plan of the Site with the extent of the former landholdings associated with Manor Farm highlighted in purple.

2.13. Very limited glimpsed views of upper elements of the roof of the farmhouse may be possible from the far northern part of the Site. In such views, the main element of the house would be obscured by development to the south and intervening mature vegetation, with no understanding as to the overall form or detailing of the farmhouse. No views of the Listed Wall or gardens are anticipated for the same reasoning.

2.14. Due to screening provided by development to the south of the group, and intervening mature vegetation, no views of the Site are anticipated to be obtainable from the farmhouse, Listed Wall or the gardens. No co-visibility between the group and the Site from Gaunt's Earthcott Lane was identified during the Site visit.

Statement of Significance

2.15. The heritage significance of Grade II* Listed Manor Farm Farmhouse is primarily derived from the architectural and historic interest of its physical fabric as an example of a 16th-century farmhouse which has developed throughout the post-medieval and modern periods.

2.16. The heritage significance of the Grade II Listed Wall is primarily derived from the architectural and historic interest of their physical fabric as an example of a 18th-century boundary feature.

2.17. Any heritage significance that the non-designated park and garden may be deemed to hold would primarily derived from the historic and aesthetic interest of the space as an example

of a modern garden which has sought to incorporated earlier designed landscape and garden features. However, as set out above, we considered that the asset is of limited significance, at most, based upon the observations made during the site visit.

2.18. The 'setting' of the assets also contribute to their significance, although the significance derived from their 'setting' is less than that derived from its historic fabric. It is also important to take into account the level of change which has previously occurred in the immediate surrounds of the Site, as discussed above. Furthermore, the elements of their 'setting' which contribute to their significance differs from asset to asset due to their differing nature; however, the 'group value' and joint experience is a common positive factor to all.

The 'Setting' of Manor Farmhouse

2.19. The principal elements of the physical surrounds and experience of Manor Farmhouse (its "*setting*") which are considered to contribute to its heritage significance comprise:

- The physical and visual relationship between the farmhouse, the wall and the wider garden, and the contribution which this makes to the overall understanding and experience of the asset.
- The physical and visual relationship between the farmhouse and the remnants of the former historic farmstead to the south (for example, the converted former agricultural buildings), and the contribution which this makes to the overall understanding and experience of the asset.
- The glimpsed views of the farmhouse from Gaunt's Earthcott Lane and the contribution which this makes to the experience and appreciation of the asset.
- The spatial relationship between Manor Farm, Court Farm and Green Farm in forming the historic elements of the dispersed hamlet of Gaunt's Earthcott.

2.20. As a result of the changes which have occurred to the south of the group in the 20th and 21st centuries (as discussed above) the historic associative and functional connection between the farmhouse and its former landholdings is not considered to form part of the 'setting' of the asset which now contributes to its heritage significance.

2.21. The only elements of the former landholdings which can be considered to make any form of positive contribution to the understanding and experience of the group is the immediate agricultural hinterland (and former landholdings) which lie to the immediate south, beyond the modern and converted historic buildings. Due to the level of physical and spatial separation which has occurred as a result of 20th and 21st-century development, the contribution made by these areas to the overall heritage significance of the group is now considered to be limited.

2.22. Whilst aspects of the Site once formed part of the agricultural landholdings associated with Manor Farm, this is no longer understood or appreciated due to the previous, and well established change in use and character of the Site from agricultural land to a modern golf course. This, coupled with the spatial and visual separation noted above, leads to the conclusion that any historic association or functional connections between the former landholdings within the Site and the asset no longer contributes to its overall heritage significance due to the lack of understanding and intelligibility.

2.23. As detailed above, there are no strong visual connections between the Site and the asset, and where glimpsed views may be obtainable, they do not enhance the understanding, experience or appreciation of the farmhouse.

2.24. Overall, when taking into account the current baseline, the Site is considered to form part of the setting of Manor Farm Farmhouse which makes a neutral contribution to its overall heritage significance, neither contributing to nor detracting from its heritage significance.

The 'Setting' of the Grade II Listed Wall

2.25. The principal elements of the physical surrounds and experience of Listed Wall (its "*setting*") which are considered to contribute to its heritage significance comprise:

- The physical relationship between the wall, the farmhouse and garden.
- The experience and appreciation of the wall from within the bounds of the garden.

2.26. The Site is not considered to form part of the setting of the Listed Wall which contributes to its overall heritage significance.

The 'Setting' of the Non-Designated Garden

2.27. Analysis of the current form of the garden and archival sources does not indicate that views into or out of the garden area formed a key part of its design intent, nor did the physical relationship with the wider Manor Farm complex. When taking into account the current baseline, it is not considered that the 'setting' of the non-designated garden contributes to its overall heritage significance.

2.28. The Site is not considered to form part of the setting of the non-designated garden which contributes to its overall heritage significance.

Summary Conclusions

2.29. In summary, the Site is considered to form part of the 'setting' of the Grade II Listed Manor Farmhouse which makes a neutral contribution to its overall heritage significance. The Site is not, however, considered to form part of the 'setting' of the Listed Wall and non-designated garden.

Grade II Listed Court Farm

2.30. The Grade II Listed Court Farm was added to the National List in October 1952, and comprises a 17th-century farmhouse, with later 19th and 20th-century alterations. The South Gloucestershire Historic Environment Record (HER) identifies that the northwest corner of the farmhouse likely comprised a medieval chapel, with the presence of a chapel denoted on historic mapping.

2.31. The asset is situated amongst a farmstead complex, comprising modern and historic structures, to the south of Gaunt's Earthcott Lane. The principal elevation is to the southeast where the asset faces an enclosed domestic garden and a series of agricultural buildings beyond.



Plate 5: Aerial view of Court Farm Farmhouse as set within its current farmstead complex.

2.32. A review of archival sources has demonstrated that the historic landholdings associated with the Court Farm farmstead were located to the immediate east, south and west of the complex. Whilst much of the Site was historically in the same overall ownership as Green Farm (owned by Henry Bengough Esq.), differences in recorded tenants indicates that such areas did not form part of the land tenanted as part of Court Farm (see comments above regarding the Bengough estate as whole).

2.33. Views of Court Farm from within the Site were not identified during the site visit. Furthermore, based upon onsite observations it is not anticipated that views of the Site as currently extant are obtainable from the asset. Should they be obtainable, it is anticipated that any views would be isolated to views from the upper floor of the secondary west elevation. In such views the Site is anticipated to be read as an area of undeveloped land, with a modern leisure character, beyond the immediate built environs of Gaunt's Earthcott as positioned along Gaunt's Earthcott Lane, with a variety of modern features (such as overhead power lines) also visible.

Statement of Significance

2.34. The heritage significance of Court Farm is primarily derived from the architectural and historic interest of its physical fabric as an example of a 17th-century farmhouse, with later alterations, potentially incorporating an earlier medieval chapel.

2.35. The 'setting' of the asset also contributes to the significance of the asset, although the significance derived from the setting is less than that derived from its historic fabric. The principal elements of the physical surrounds and experience of the asset (its "*setting*") which are considered to contribute to its heritage significance comprise:

- The spatial and visual relationship with the associated farmstead, in particular the understanding and experience of the two.
- The experience and appreciation of the asset from the immediate agricultural landscape which surrounds the asset to the east, south and west, i.e., the experience and appreciation of the asset from within the bounds of its historic agricultural hinterland.
- The spatial relationship between Court Farm, Manor Farm and Green Farm in forming the historic elements of the dispersed hamlet of Gaunt's Earthcott.

2.36. As set out above, there are no known historic functional connections between the operation of Court Farm and the Site. Whilst noting the land ownership, due to the lack of functional connections, this is not considered sufficient to result in the Site forming part of the 'setting' which contributes to its overall heritage significance.

2.37. Furthermore, there is not clear visual connectivity between Court Farm and the Site. Should the Site be possible from the asset, such views are not anticipated to contribute to the overall understanding, experience or appreciation of the asset, in particular when taking into account the current baseline, distance and mature intervening vegetation.

Summary Conclusions

2.38. In summary, the Site is not considered to form part of the 'setting' of the Grade II Listed Court Farm which contributes to its overall heritage significance.

2.39. It is, however, recognised that the development of the Site could introduce built form into the Site which may be visible from the asset. Thus, despite the above conclusions, Green Farm will be discussed in **Section 3** as applicable.

Grade II Listed Green Farm

2.40. The Grade II Listed Green Farm was added to the National List in October 1952 and comprises a late 17th-century farmhouse, with 18th, 19th and 20th-century additions and alterations.

2.41. The asset is set amongst its historic farmstead complex (elements of which may now have been converted for separate residential use) on the north side of Gaunt's Earthcott Lane. The principal dwelling faces southwards across a domestic garden and towards the Lane beyond, with the secondary elements more commonly associated with the wider farmstead

complex. The farmhouse is visible set amongst the farmstead from the Lane, and its agricultural environs to the north, east and west.



Plate 6: Aerial view of Green Farm Farmhouse as set within its current farmstead complex.

2.42. A review of archival sources has demonstrated that the historic landholdings associated with the Green Farm farmstead were located to the north, east and west of the complex to the north of Gaunt's Earthcott Lane. Whilst much of the Site was historically in the same overall ownership as Green Farm (owned by Henry Bengough Esq.), differences in recorded tenants indicates that such areas did not form part of the land tenanted as part of Court Farm (see comments above regarding the Bengough estate as whole).

2.43. Views of Green Farm from within the Site were not identified during the site visit. Furthermore, based upon onsite observations it is not anticipated that views of the Site as currently extant are obtainable from the asset. Should they be obtainable, it is anticipated that any views would be isolated to views from the upper floor of the secondary west elevation. In such views, the Site is anticipated to be read as an area of undeveloped land, with a modern leisure character, beyond the immediate built environs of Gaunt's Earthcott as positioned along Gaunt's Earthcott Lane, with a variety of modern features (such as overhead power lines) also visible.

Statement of Significance

2.44. The heritage significance of Green Farm is primarily derived from the architectural and historic interest of its physical fabric as an example of a 17th-century farmhouse which has developed throughout the post-medieval and modern periods.

2.45. The 'setting' of the asset also contributes to the significance of the asset, although the significance derived from the setting is less than that derived from its historic fabric. The principal elements of the physical surrounds and experience of the asset (its "*setting*") which are considered to contribute to its heritage significance comprise:

- The spatial and visual relationship with the associated farmstead, in particular the understanding and experience of the two.
- The experience and appreciation of the asset from Gaunt's Earthcott Lane.
- The experience and appreciation of the asset from the immediate agricultural landscape which surrounds the asset to the north, east and west, i.e., the experience and appreciation of the asset from within the bounds of its historic agricultural hinterland.
- The spatial relationship between Green Farm, Court Farm and Manor Farm in forming the historic elements of the dispersed hamlet of Gaunt's Earthcott.

2.46. As set out above, there are no known historic functional connections between the operation of Green Farm and the Site. Whilst noting the land ownership, due to the lack of functional connections, this is not considered sufficient to result in the Site forming part of the 'setting' which contributes to its overall heritage significance.

2.47. Furthermore, there is not clear visual connectivity between Green Farm and the Site. Should views of the Site be possible from the asset, such views are not anticipated to contribute to the overall understanding, experience or appreciation of the asset, in particular when taking into account the current baseline, distance and mature intervening vegetation.

Summary Conclusions

2.48. In summary, the Site is not considered to form part of the 'setting' of the Grade II Listed Green Farm which contributes to its overall heritage significance.

2.49. It is, however, recognised that the development of the Site could introduce built form into the Site which may be visible from the asset. Thus, despite the above conclusions, Green Farm will be discussed in **Section 3** as applicable.

3. Assessment of Potential Impact.

3.1. The following provides an overview of the potential impact that may occur from the development of the Site on the heritage significance of the group of heritage assets at Gaunt's Earthcott (as discussed in **Section 2**), as a result of a change in 'setting'. It will first consider potential impacts associated with the development of the Site as a generalised concept, followed by a consideration of the masterplan which forms part of the wider promotional package. It will also consider the potential impact of other proposed allocation sites on the impacts that would arise from the development of the Site.

Development of the Site 'In-Principle'

3.2. The development of the Site would 'in-principle' result in a change in character to land within its bounds (from modern leisure to urban environment). With specific regard to Manor Farm Farmhouse, this would result in a further change in character to part of the historic landholdings associated with the farm complex; however, as set out in **Section 2** the former landholdings within the Site are not considered to contribute to the significance of the asset due to the level of change which has already occurred.

3.3. The development of the Site would bring modern development closer to the group of heritage assets at Gaunt's Earthcott. However, due to the separation between the Site and the group of heritage assets at Gaunt's Earthcott (*c.*400m at their closest point), a clear separation between the new development and the detached hamlet would remain.

3.4. Modern built form may be visible from group of heritage assets at Gaunt's Earthcott, and/or co-visible with the assets from within the bounds of Site and the wider environs.

3.5. When taking into account the manner in which the Site contributes to the overall heritage significance of the group of heritage assets at Gaunt's Earthcott (see **Section 2**), and in the context of the change that would occur from the development of the Site 'in-principle', it is anticipated that this could result in:

- Less than substantial harm, at the lower end of the spectrum at most, to the Grade II Listed Manor Farmhouse.
- Less than substantial harm, at the very lower end of the spectrum at most, to the Grade II Listed Court Farm.
- Less than substantial harm, at the very lower end of the spectrum at most, to the Grade II Listed Green Farm.
- No harm to the Grade II Listed Walls at Manor Farm.
- No harm to the non-designated Local Park and Garden at Manor Farm.

3.6. It has, however, highlighted that the above is derived from the consideration of 'development' of the land in general and does not take into account how layout and design (including height and massing) could reduce or remove potential impacts.

Consideration of the Emerging Masterplan

3.7. The following considers the masterplan which forms part of the wider promotional package as shown on DWG No. 3207.

3.8. With specific regard to the consideration of the above heritage assets, the following aspects of the layout and design principles are noted:

- The northern parts of the Site closest to Gaunt's Earthcott would be utilised as public open space and a dense landscape edge introduced.
- Development in the northern part of the Site would be limited to residential development. Built form would be positioned *c.*490m from the group of assets at Manor Farm, *c.*620m from Court Farm and *c.*670m from Green Farm. Thus, a clear separation would remain between the new development, the assets and the hamlet in general. This, coupled with the proposed landscaping referenced above, and further design consideration of the height and design of buildings in the northern part of the Site would reduce the extent to which the new development may be visible from the assets.
- The potential mixed use local centre and school site would be positioned in the central part of the Site, beyond a new linear landscaped area.
- PRoW connections which extend from the Site towards Gaunt's Earthcott will remain, and thus the ability to appreciate the assets, including as set within a disbursed hamlet, on the approach from southwest would remain.
- Whilst the proposals include a main access point from Gaunt's Earthcott Lane, this is set some distance from the designated heritage assets and adjacent to the modern road bridge which crosses the M5 motorway. The positioning of the access in this location would prevent a change in character to Gaunt's Earthcott Lane in the vicinity of the assets.

3.9. When taking into account the layout and design measures embedded in the masterplan (DWG No. 3207), and the manner in which detailed design could further influence matters, it is anticipated that the harm arising to the identified heritage assets at Gaunt's Earthcott as a result of its implementation would be as follows:

- Less than substantial harm at the very lower end of the spectrum, at most, to the Grade II Listed Manor Farmhouse.
- No harm to the Grade II Listed Court Farm.
- No harm to the Grade II Listed Green Farm.
- No harm to the Grade II Listed Walls at Manor Farm.
- No harm to the non-designated Local Park and Garden at Manor Farm.

4. Summary Conclusions.

4.1. In summary, the only built heritage assets that have been identified as sensitive to the development of Land at Woodland Golf Course (Site ID: EPS-FC14) are:

- Group of heritage assets at Manor Farm, comprises the Grade II* Listed Manor Farmhouse, Grade II Listed Wall and non-designated Local Historic Park and Garden, located *c.*400m northeast of the Site at its closest point.
- Grade II Listed Court Farm Farmhouse, located *c.*545m northeast of the Site.
- Grade II Listed Green Farm Farmhouse, located *c.*580m northeast of the Site.

4.2. Subject to design (included measures shown on the masterplan which forms part of the wider promotional package) it is concluded that development could come forward at Land at Woodland Golf Course which would result in:

- Less than substantial harm at the lower end of the spectrum, at most, to the Grade II Listed Manor Farm Farmhouse.
- No harm to the Grade II Listed Court Farm, Grade II Listed Green Farm and the Grade II Listed Walls and non-designated local park and garden at Manor Farm.

4.3. Section 66(1) of the Planning (Listed Buildings and Conservation Areas) Act 1990 states:

"In considering whether to grant planning permission [or permission in principle] for development which affects a listed building or its setting, the local planning authority or, as the case may be, the Secretary of State, shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses."[2] (our emphasis)

4.4. Key is the use of the terms 'special regard' and 'desirability'. Section 66(1) does not state that where a development does not preserve or enhance a development that it must be considered contrary to legislation and should be refused.

4.5. This is echoed in the 'Palmer' case, which whilst considering Listed Buildings, sets out that:

"Although the statutory duty requires special regard to be paid to the desirability of not harming the setting of a listed building, that cannot mean that any harm, however minor, would necessarily require planning permission to be refused."[3]

4.6. As clarified by the Court of Appeal ('Mordue'[4]), where the principles of the NPPF (specifically that now given under §208 of the NPPF) are applied this is in keeping with the duties of the Planning (Listed Buildings and Conservation Areas) Act 1990, which requires

[2] UK Public General Acts, Planning (Listed Buildings and Conservation Areas) Act 1990, Section 66(1).
[3] Palmer v Herefordshire Council & Anor [2016] EWCA Civ 1061. Paragraph 34.
[4] Jones v Mordue [2015] EWCA Civ 1243.

'special regard' to be paid to 'desirability of preserving the architectural and historic interest of a Listed Building, including any contribution made by its 'setting'.

4.7. In regard to demonstrating the 'clear and convincing justification', the Courts ('Pugh'[5]) have held that where the decision-maker works through the sequence for dealing with proposals which impact upon heritage assets in the context of §205-208 of the NPPF and finds that any harm to significance is outweighed by public benefits, then the clear and convincing justification referred to at §206 of the NPPF is in place.

4.8. The above points are made in full recognition of the 'great weight' referred to in §199 of the NPPF and the 'Barnwell' decision[6] which established that there is a strong presumption against the granting of planning permission where development proposals would cause harm to the significance of a designated heritage asset. It is, however, highlighted that a subsequent High Court Decision ('Forge Fields'[7]) concluded: "*The presumption is a statutory one. It is not irrebuttable. It can be out weighed by material considerations powerful enough to do so.*" The public benefits exercise is one such consideration, in the same way that it is a consideration for meeting the statutory duty of Section 66(1) and the need to provide 'clear and convincing justification' as outlined above.

4.9. Accordingly, the harm identified to Manor Farm Farmhouse, should not be viewed as an overriding and 'in-principle' constraint to the allocation of the Site, in particular when taking into account the low level of harm identified and how design measures could reduce or remove harm.

[5] Pugh v SoS for Communities and Local Government [2015] EWHC 3 (Admin)
[6] Barnwell Manor Wind Energy Ltd v (1) East Northamptonshire DC & Others [2014] EWCA Civ 137.
[7] R (Forge Field Society) v Sevenoaks District Council [2014] EWHC 1895 (Admin)

Appendix 1: Methodology.

Assessment of Significance

In the *NPPF*, heritage significance is defined as:

> ***"The value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting. For World Heritage Sites, the cultural value described within each site's Statement of Outstanding Universal Value forms part of its significance."***[8]

Historic England's *GPA:2* gives advice on the assessment of significance as part of the application process. It advises understanding the nature, extent, and level of significance of a heritage asset.[9]

In order to do this, *GPA 2* also advocates considering the four types of heritage value an asset may hold, as identified in English Heritage's *Conservation Principles*.[10] These essentially cover the heritage 'interests' given in the glossaries of the *NPPF* and the *PPG* which are archaeological, architectural and artistic, and historic.[11]

The *PPG* provides further information on the interests it identifies:

- ***Archaeological interest:*** *As defined in the Glossary to the National Planning Policy Framework, there will be archaeological interest in a heritage asset if it holds, or potentially holds, evidence of past human activity worthy of expert investigation at some point.*

- ***Architectural and artistic interest:*** These are interests in the design and general aesthetics of a place. They can arise from conscious design or fortuitously from the way the heritage asset has evolved. More specifically, architectural interest is an interest in the art or science of the design, construction, craftsmanship and decoration of buildings and structures of all types. Artistic interest is an interest in other human creative skills, like sculpture.

- ***Historic interest*:** An interest in past lives and events (including pre-historic). Heritage assets can illustrate or be associated with them. Heritage assets with historic interest not only provide a material record of our nation's history, but can also provide meaning for communities derived from their collective experience of a place and can symbolise wider values such as faith and cultural identity.[12]

Significance results from a combination of any, some, or all of the interests described above.

---

[8] DLUHC, *NPPF*, Annex 2.
[9] Historic England, *GPA:2*.
[10] Historic England, *Conservation Principles: Policies and Guidance for the Sustainable Management of the Historic Environment* (London, April 2008). These heritage values are identified as being 'aesthetic', 'communal', 'historical' and 'evidential', see idem pp. 28–32.
[11] DLUHC, *NPPF*, *Annex 2*; DLUHC, *PPG, paragraph 006, reference ID: 18a-006-20190723*.
[12] DLUHC, *PPG*, paragraph 006, reference ID: 18a-006-20190723.

Historic England guidance on assessing heritage significance, *HEAN:12*, advises using the terminology of the *NPPF* and *PPG*, and thus it is that terminology which is used in this Report. [13]

Setting and Significance

As defined in the NPPF:

> ***"Significance derives not only from a heritage asset's physical presence, but also from its setting."***[14]

Setting is defined as:

> ***"The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral."***[15]

Therefore, setting can contribute to, affect an appreciation of significance, or be neutral with regards to heritage values.

Assessing Change Through Alteration to Setting

How setting might contribute to these values has been assessed within this Report with reference to *GPA:3*, particularly the checklist given on page 11. This advocates the clear articulation of "*what matters and why*".[16]

In *GPA:3*, a stepped approach is recommended, of which Step 1 is to identify which heritage assets and their settings are affected. Step 2 is to assess whether, how and to what degree settings make a contribution to the significance of the heritage asset(s) or allow significance to be appreciated. The guidance includes a (non-exhaustive) checklist of elements of the physical surroundings of an asset that might be considered when undertaking the assessment including, among other things: topography, other heritage assets, green space, functional relationships and degree of change over time. It also lists aspects associated with the experience of the asset which might be considered, including: views, intentional intervisibility, tranquillity, sense of enclosure, accessibility, rarity and land use.

Step 3 is to assess the effect of the proposed development on the significance of the asset(s). Step 4 is to explore ways to maximise enhancement and minimise harm. Step 5 is to make and document the decision and monitor outcomes.

A Court of Appeal judgement has confirmed that whilst issues of visibility are important when assessing setting, visibility does not necessarily confer a contribution to significance and factors other than visibility should also be considered, with Lindblom LJ stating at paragraphs 25 and 26 of the judgement (referring to an earlier Court of Appeal judgement):

---

[13] Historic England, *Statements of Heritage Significance: Analysing Significance in Heritage Assets, Historic England Advice Note 12* (Swindon, October 2019).
[14] DLUHC, *NPPF*, Annex 2.
[15] DLUHC, *NPPF*, Annex 2.
[16] Historic England, *GPA:3*, pp. 8, 11.

> ***Paragraph 25 – "But – again in the particular context of visual effects – I said that if "a proposed development is to affect the setting of a listed building there must be a distinct visual relationship of some kind between the two – a visual relationship which is more than remote or ephemeral, and which in some way bears on one's experience of the listed building in its surrounding landscape or townscape" (paragraph 56)".***
>
> ***Paragraph 26 – "This does not mean, however, that factors other than the visual and physical must be ignored when a decision-maker is considering the extent of a listed building's setting. Generally, of course, the decision-maker will be concentrating on visual and physical considerations, as in Williams (see also, for example, the first instance judgment in R. (on the application of Miller) v North Yorkshire County Council [2009] EWHC 2172 (Admin), at paragraph 89). But it is clear from the relevant national policy and guidance to which I have referred, in particular the guidance in paragraph 18a-013-20140306 of the PPG, that the Government recognizes the potential relevance of other considerations – economic, social and historical. These other considerations may include, for example, "the historic relationship between places". Historic England's advice in GPA3 was broadly to the same effect."*** [17]

When considering cases where impacts are associated with changes in 'setting' only, a recent Secretary of State Appeal Decision (henceforth referred to as the 'Edith Summerskill House Decision') has clearly set out that:

> ***"In cases where the impact is on the setting of a designated heritage asset, it is only the significance that asset derives from its setting that is affected. All the significance embodied in the asset itself would remain intact. In such a case, unless the asset concerned derives a major proportion of its significance from its setting, then it is very difficult to see how an impact on its setting can advance a long way along the scale towards substantial harm to significance."*** [18] (our emphasis)

Within the preceding paragraph of the Edith Summerskill House Decision the Inspector provides the following narrative on substantial harm and the less than substantial harm 'spectrum':

> ***"… substantial harm is set at a high bar, such that a good deal (or all) of the significance of a designated heritage asset would have to be removed for it to be reached. That means that the range for a finding of less than substantial harm is very wide indeed, from a harmful impact that is hardly material, to something just below that high bar."*** [19]

Levels of Significance

Descriptions of significance will naturally anticipate the ways in which impacts will be considered. Hence descriptions of the significance of Conservation Areas will make reference to their special interest and character and appearance, and the significance of Listed Buildings will be discussed with reference to the building, its setting and any features of special architectural or historic interest which it possesses.

---

[17] Catesby Estates Ltd. V. Steer [2018] EWCA Civ 1697, paras. 25 and 26.
[18] APP/H5390/V/21/327713 [2023] - Edith Summerskill House, Clem Attlee Court, London, SW6 7TW, Paragraph 12.5 of main Decision
[19] Ibid, Paragraph 12.4 of main Decision.

In accordance with the levels of significance articulated in the *NPPF* and the *PPG*, three levels of significance are identified:

- **Designated heritage assets of the highest significance,** as identified in paragraph 206 of the NPPF, comprising Grade I and II* Listed Buildings, Grade I and II* Registered Parks and Gardens, Scheduled Monuments, Protected Wreck Sites, World Heritage Sites and Registered Battlefields (and also including some Conservation Areas) and non-designated heritage assets of archaeological interest which are demonstrably of equivalent significance to Scheduled Monuments, as identified in footnote 72 of the NPPF;[20]

- **Designated heritage assets of less than the highest significance,** as identified in paragraph 206 of the NPPF, comprising Grade II Listed Buildings and Grade II Registered Parks and Gardens (and also some Conservation Areas);[21] and

- **Non-designated heritage assets.** Non-designated heritage assets are defined within the PPG as "*buildings, monuments, sites, places, areas or landscapes identified by plan-making bodies as having a degree of significance meriting consideration in planning decisions, but which do not meet the criteria for designated heritage assets*".[22]

Additionally, it is of course possible that sites, buildings or areas have no heritage significance.

Assessment of Harm

Assessment of any harm will be articulated in terms of the policy and law that the proposed development will be assessed against, such as whether a proposed development preserves or enhances the character or appearance of a Conservation Area, and articulating the scale of any harm in order to inform a balanced judgement/weighing exercise as required by the NPPF.

In accordance with key policy, the following levels of harm may potentially be identified for designated heritage assets:

- **Substantial harm or total loss.** It has been clarified in a High Court Judgement of 2013 that this would be harm that would "*have such a serious impact on the significance of the asset that its significance was either vitiated altogether or very much reduced*";[23] and

- **Less than substantial harm.** Harm of a lesser level than that defined above.

With regards to these two categories, the *PPG* states:

> ***"Within each category of harm (which category applies should be explicitly identified), the extent of the harm may vary and should be clearly articulated."***[24]

[20] DLUHC, *NPPF*, para. 206 and fn. 72.
[21] DLUHC, *NPPF,* para. 206.
[22] DLUHC, *PPG*, paragraph 039, reference ID: 18a-039-20190723.
[23] Bedford Borough Council v Secretary of State for Communities and Local Government [2013] EWHC 2847 (Admin), para. 25.
[24] DLUHC, *PPG*, paragraph 018, reference ID: 18a-018-20190723.

Hence, for example, harm that is less than substantial would be further described with reference to where it lies on that spectrum or scale of harm, for example low end, middle, and upper end of the less than substantial harm spectrum/scale.

With regards to non-designated heritage assets, there is no basis in policy for describing harm to them as substantial or less than substantial, rather the *NPPF* requires that the scale of any harm or loss is articulated whilst having regard to the significance of the asset. Harm to such assets is therefore articulated as a level of harm to their overall significance, using descriptors such as minor, moderate and major harm.

It is also possible that development proposals will cause no harm or preserve the significance of heritage assets. Here, a High Court Judgement of 2014 is relevant. This concluded that with regard to preserving the setting of a Listed building or preserving the character and appearance of a Conservation Area, "*preserving*" means doing "*no harm*".[25]

Preservation does not mean no change, it specifically means no harm. *GPA:2* states that "*Change to heritage assets is inevitable but it is only harmful when significance is damaged*".[26] Thus, change is accepted in Historic England's guidance as part of the evolution of the landscape and environment. It is whether such change is neutral, harmful or beneficial to the significance of an asset that matters.

As part of this, setting may be a key consideration. When evaluating any harm to significance through changes to setting, this Report follows the methodology given in *GPA:3*, described above. Fundamental to this methodology is a consideration of "*what matters and why*".[27] Of particular relevance is the checklist given on page 13 of *GPA:3*.[28]

It should be noted that this key document also states:

> ***"Setting is not itself a heritage asset, nor a heritage designation…"***[29]

Hence any impacts are described in terms of how they affect the significance of a heritage asset, and heritage interests that contribute to this significance, through changes to setting.

With regards to changes in setting, *GPA:3* states that:

> ***"Conserving or enhancing heritage assets by taking their settings into account need not prevent change".***[30]

Additionally, whilst the statutory duty requires that special regard should be paid to the desirability of not harming the setting of a Listed Building, that cannot mean that any harm, however minor, would necessarily require Planning Permission to be refused. This point has been clarified in the Court of Appeal.[31]

---

[25] R (Forge Field Society) v Sevenoaks District Council [2014] EWHC 1895 (Admin).
[26] Historic England, *GPA:2*, p. 9.
[27] Historic England, *GPA:3*, p. 8.
[28] Historic England, *GPA:3*, p. 13.
[29] Historic England, *GPA:3*, p. 4.
[30] Historic England, *GPA 3.*, p. 8.
[31] Palmer v Herefordshire Council & Anor [2016] EWCA Civ 1061.

Photographs

Photographs included in this Report are for illustrative purposes only to assist in the discussions of heritage assets, their settings, and views, where relevant. Unless explicitly stated, they are not accurate visual representations of the site or development proposals, nor do they conform to any standard or guidance i.e., the Landscape Institute Technical Guidance Note 06/19. However, the photographs included are intended to be an honest representation and are taken without the use of a zoom lens or edited, unless stated in the description or caption.

Appendix 2: Site Photographs.



Plate 1.1: View north across the modern golf course in the direct of Gaunt's Earthcott.



Plate 1.2: View northwest across the golf course demonstrating the modern form and character.



Plate 1.3: View southwest across the golf course demonstrating the modern form and character.



Plate 1.4: Grouping of buildings (modern and historic) at Manor Farm as seen from the south, demonstrating the level to which buildings surround the Farmhouse.



Plate 1.5: Grouping of buildings (modern and historic) at Manor Farm as seen from the southeast. The ridge/roof of Manor Farm Farmhouse is indicated by the blue arrow, with Green Farm to the northeast of the grouping indicated by the orange arrow.



Plate 1.6: Grouping of buildings (modern and historic) at Manor Farm as seen from the south, demonstrating the level to which buildings surround the Farmhouse and screen views to/from it.



Plate 1.7: Manor Farm Farmhouse as seen from the paddock to the east.



Plate 1.8: View in the direction of the Site from the paddock to the east of the Manor Farm Farmhouse (visible in the far righthand of the frame).



Plate 1.9: Manor Farm Farmhouse as seen from Gaunt's Earthcott Lane.



Plate 1.10: Court Farm as seen from the adjacent PRoW.



Plate 1.11: View towards the Court Farm complex from Gaunt's Earthcott Lane to the north.



Plate 1.12: Green Farm as seen from Gaunt's Earthcott Lane.



Plate 1.13: View west along Gaunt's Earthcott Lane in the vicinity of the entrance to the Court Farm complex and Green Farm.



Plate 1.13: View east along Gaunt's Earthcott Lane in the vicinity of Manor Farm.

•

Planning (Listed Buildings and Conservation Areas) Act 1990
Town & Country Planning Act 1990 (as amended)
Planning and Compulsory Purchase Act 2004

Bristol
First Floor, South Wing, Equinox North,
Great Park Road, Almondsbury, Bristol, BS32 4QL
T 01454 625945
E Bristol@pegasusgroup.co.uk
Offices throughout the UK.

Expertly Done.

DESIGN | ECONOMICS | ENVIRONMENT | HERITAGE | LAND & PROPERTY | PLANNING | TRANSPORT & INFRASTRUCTURE

Pegasus Group is a trading name of Pegasus Planning Group Limited (07277000) registered in England and Wales.
Registered office: 33 Sheep Street, Cirencester, GL7 1RQ
We are **ISO** certified **9001**, **14001**, **45001**

Pegasus_Group pegasusgroup Pegasus_Group

PEGASUSGROUP.CO.UK

grassroots
PLANNING

Grass Roots Planning Ltd
Suites 9 & 10
Bristol North Baths
Gloucester Road
Bristol
BS7 8BN
t: 0117 930 0413 grassroots-planning.co.uk