

8 Transport and Access

8.1 Introduction

- 8.1.1 This chapter of the Environmental Statement assesses the likely significant environmental effects of the Proposed Development on the local area and sensitive receptors with respect to transport, including highway network, public transport, cycling and walking.
- 8.1.2 This chapter has been prepared by Momentum Transport Consultancy. In accordance with Regulation 18(5) of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, as amended, a statement outlining the relevant expertise and qualifications of competent experts appointed to prepare this ES is provided in **Appendix A.4**.
- 8.1.3 The appendices that support this chapter are listed below:
- Appendix C.1: Transport Assessment (TA)

8.2 Policy Context, Legislation, Guidance and Standards

National Planning Policy

National Planning Policy Framework (2021)

- 8.2.1 The National Planning Policy Framework (NPPF) is produced by the Department for Communities and Local Government (2021) and sets out the Government's planning policies. Transport policy is dealt within the 'Promoting Sustainable Transport' section, which emphasises the need for the "transport system to be balanced in favour of sustainable transport modes, giving people a real chance about how they travel".

Planning Practice Guidance (PPG)

- 8.2.2 The Planning Practice Guidance sits alongside the NPPF and is regularly updated to ensure the latest policy position is reflected. The PPG includes guidance on the preparation of Travel Plans and Transport Assessments, which have been considered in the preparation of these documents and the assessment methodologies.

Local Planning Policy

South Gloucestershire Core Strategy 2006 – 2027 (2013)

- 8.2.3 The South Gloucestershire Local Plan: Core Strategy (2006 – 2027) was adopted in 2013. This report was published as part of South Gloucestershire's Local Plan alongside the Joint Waste Core Strategy (2011), and the Policies, Sites and Places Development Plan Document (2017).
- 8.2.4 The purpose of this document is to introduce policies that can support sustainable communities, enabling South Gloucestershire to be a liveable place. The strategy introduces policies to set out how growth will be managed up to 2027.
- 8.2.5 The document is separated into two sections. Part 1 being the general core strategy policies and Part 2 which comprises the spatial strategy for the different areas of South Gloucestershire. Part 1, Chapter 7 of the document outlines transport policies designed to "tackle congestion and improve accessibility". The objectives of the policy include reducing congestion by private cars through enhancing accessibility by increasing public transport provision and improving the opportunities for walking and cycling.

8.2.6 Part 2, Chapter 12 of the document outlines the spatial strategy for communities of the North Fringe of Bristol Urban Area. The issues identified for this area include:

- There are more people working than living in the area. Therefore, there is a high level of daily commuting in and out of the area and consequently traffic congestion at peak times.
- Congestion in the area has affected the reliability and frequency of public transport through the area.
- A lack of local amenity provision in comparison to the rapid growth.
- A lack a clear identity and sense of place.

Policies, Sites and Places Plan (2017)

8.2.7 The Policies, Sites and Places (PSP) Plan forms part of the South Gloucestershire Local Plan, together with the Core Strategy and the Joint Waste Core Strategy. The Plan is set out in two parts of which the first covers policies for managing new development and the second covers the allocation and protection of sites and places within South Gloucestershire.

8.2.8 As part of the strategy, the PSP includes a section on Tackling Congestion and Improving Accessibility within which a set of policies address key transport priorities for the area including:

- Active travel routes
- Transport impact management
- Safeguarding strategic transport schemes and infrastructure
- Parking standards

8.2.9 These policies are intended to ensure that development proposals that generate a demand for travel will take into consideration the modal priorities as set out in the Plan, safeguarding existing and proposed transport infrastructure delivered in the South Gloucestershire area.

8.2.10 The PSP also details the cycle and vehicle parking standards as set out for each land use type including residential dwellings. The required provision recognises the need for improving accessibility in the area by means other than the car and the importance of delivering vibrant and economically sustainable environments without relying on car ownership. The Council maintains the importance of provision for instances where alternatives to the car are not readily achievable and provision for mobility impaired and other disability groups.

South Gloucestershire Draft Local Plan (2020)

8.2.11 The Draft Local Plan (2020) for South Gloucestershire is currently being consulted on with the public and is planned to be submitted and examined by the planning inspector in 2023 and adopted in 2024.

8.2.12 As part of the priorities, the Draft Local Plan includes the goal to achieve sustainable travel and transport in the area. The objectives include the following:

- New growth should be in close proximity to existing or new key services and facilities, to create walkable and cyclable neighbourhoods.
- Effective public transport connections will be required where travel is needed.

- Facilitate walking, cycling and public transport by providing high-quality, safe connections and routes.
- Promote and bring about positive travel habits through travel planning.
- Infrastructure for alternative-fuel vehicles should be available in new developments.
- Safeguard land required for new transport schemes.

8.2.13 The Draft Local Plan has also set out Site specific area strategy for improvement. The North Fringe, where the Site is located, benefits from excellent rail, public transport, and road connections. Bristol Parkway rail station provides links to Bristol city centre, London and South Wales, benefitting from electrification of the mainline.

8.2.14 There are two further local rail stations at Filton Abbey Wood and Patchway. Further investment in rail is planned, including improvements to Parkway rail station, the opening of the Henbury Spur freight line to passenger services and two new rail stations at Henbury and North Filton. Metrobus services connect North and East Fringes of Bristol Urban Area to Bristol city centre and South Bristol, with the planned Metrobus extension from Parkway to The Mall via Cribbs Patchway New Neighbourhood currently under construction.

8.3 Consultation

8.3.1 This chapter has been written in full consideration of comments received during the scoping exercise through which comments were received from South Gloucestershire Council (SGC), Bristol City Council (BCC), National Highways and Network Rail.

8.3.2 In addition to the ES scoping process, the following meetings were also held:

- Weekly pre-application meetings with SGC Highways Officer to agree on the assessment methodology (26 meetings to date, which are planned to be continued until submission)
- Pre-application meeting on the 11th January 2022 with SGC (Transport Development Control Officer, Transport Development Control Manager), BCC (Transport Development Manager) and National Highways (Head of Planning and Development Operations, Route Manager West of England, National Highways officers)

8.3.3 Responses to key concerns raised through the scoping exercise are detailed in the TA (**Appendix C.1**) and summarised in **Table 8.1** below.

Table 8.1 Key Issues and Responses

Issue	Response
Concerns over restricting the level of traffic in practice and achieving sustainable mode shares.	As discussed with SGC, a set of transport measures are being implemented to control the level of traffic generated by the Proposed Development. These include the use of Controlled Parking Zones (CPZ), travel plan measures and strategies to increase public transport use.
The robustness of the proposed methodology and selection of TRICS sites for the trip generation resulting in possible overestimation of public transport trips and overall mode	A sensitivity analysis assessing a scenario with an increase vehicular mode share has been carried out and is presented in the TA. This approach has been agreed with SGC.

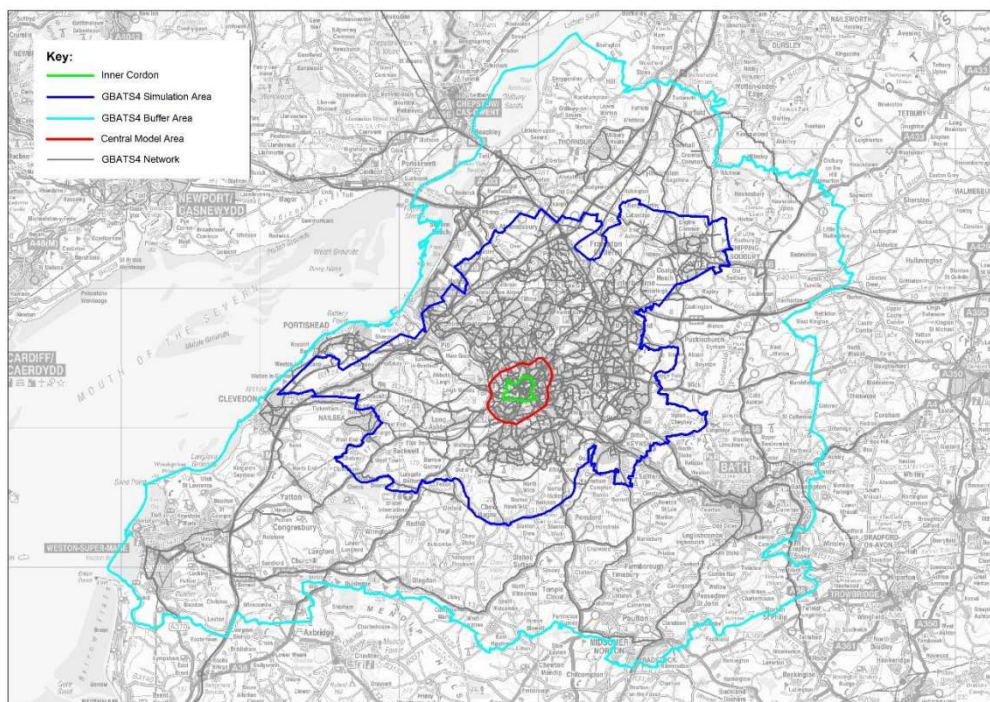
Issue	Response
share of sustainable transport modes (i.e. cycling and walking).	

8.4 Methodology

Study Area

- 8.4.1 The study area has been defined by the area covered by the Greater Bristol Area Transport Study 4 (GBATS4) model as illustrated in **Inset Inset Figure 8.1**. GBATS4 is a strategic traffic model that shows the existing traffic distribution on the highways within Greater Bristol and is what the highway network modelled in the study area is based on.

Inset Figure 8.1: Map Showing the GBATS4 Study Area



- 8.4.2 It should be noted that the assessment for the 2014 ES and previous environmental information was based on GBATS3, a previous version of the model. GBATS4 is an update of GBATS3 based on more recent traffic flow data and assumptions.
- 8.4.3 The Strategic Road Network (SRN) is excluded from the study area as there is no forecast change in vehicle trips on the SRN with the Proposed Development. Further detail that confirms this is provided in Chapter 14 of the TA (**Appendix C.1**).

Baseline Data Collection

- 8.4.4 The baseline conditions have been informed by desktop research using the following sources of data:
- **Greater Bristol Area Transport Study 4 (GBATS4) model** – a strategic demand model of the Greater Bristol area and includes vehicular and public transport trips. The GBATS4

model has provided the AM peak hour, PM peak hour and AAWT flows for the links which are examined as part of this assessment.

- **TRICS database** – TRICS is a database of trip rates for various developments around the UK used for trip generation assessments and is a standard industry tool. The database has been used to select Sites and forecast trips associated with the proposed land uses. Further details of the assumed trip rates, mode shares and trip generation are provided in the TA (**Appendix C.1**)
- Analysis of **Personal Injury Accident (PIA) data** recorded in the vicinity of the Site for the most recent five-year period from 1st November 2016 to 30th November 2021.

Assessment

- 8.4.5 This Outline Planning Application (OPA) seeks permission for vehicular access to the Site via the existing Concorde Roundabout and Combination Junction, which were not considered as access points in the extant planning consent.
- 8.4.6 This chapter will include these access points as part of the assessment of the 2036 Baseline with Proposed Development. In addition, a sensitivity analysis will be presented which carries out the same assessment using traffic flow data for a scenario in which Concorde Roundabout and Combination Junction are not used as accesses. This is due to the proximity of these junctions to the A38, which is considered to be a sensitive highway link. As a result, it has been agreed with SGC to assess both options (with and without Concorde Roundabout and Combination Junction) to better understand the impact of the Proposed Development on the capacity of these junctions and the surrounding highway network.
- 8.4.7 The operational assessment has been undertaken for 2036. It is noted that 2036 is not the date of completion of the Proposed Development, however, the GBATS4 model being used for the TA (**Appendix C.1**) uses 2036 as its end year. The supporting assessments to the extant planning consent assumed completion in 2031 and the original planning application was made in 2014 therefore a 17-year build out was assumed. It is reasonable to assume that the extant planning consent could still be built out by 2036, with phase 1 underway and 14 years still to complete the works.
- 8.4.8 As a result, to support consistency with the TA (**Appendix C.1**), the year 2036 has been identified as the future baseline year for the ES.
- 8.4.9 Therefore, the following assessment scenarios are assessed in this chapter:
- **2036 Baseline** – comprises the extant planning consent (including 2,675 dwellings), the additional works as consented through the 2021 S73 consent, the YTL Arena adjacent to the Site, approved developments (or those considered likely to have been approved and implemented by 2036) and the likely changes to the natural environment between now and 2036.
 - **2036 Baseline with Proposed Development**– presents the future transport conditions that will arise as a result of the 2036 Baseline scenario plus the densification of the Proposed Development, where Combination Junction and Concorde Roundabout are used as access points for Site.
 - **2036 Baseline with Proposed Development – without Concorde Roundabout and Combination Junction (Sensitivity Analysis)** – presents the future transport conditions that will arise as a result of the 2036 Baseline scenario plus the densification of the Proposed Development in a scenario where Combination Junction and Concorde Roundabout do not come forward as access points to the Site. This scenario is presented as a sensitivity analysis to assess the impacts should Concorde Roundabout and Combination Junction not be used as access points.

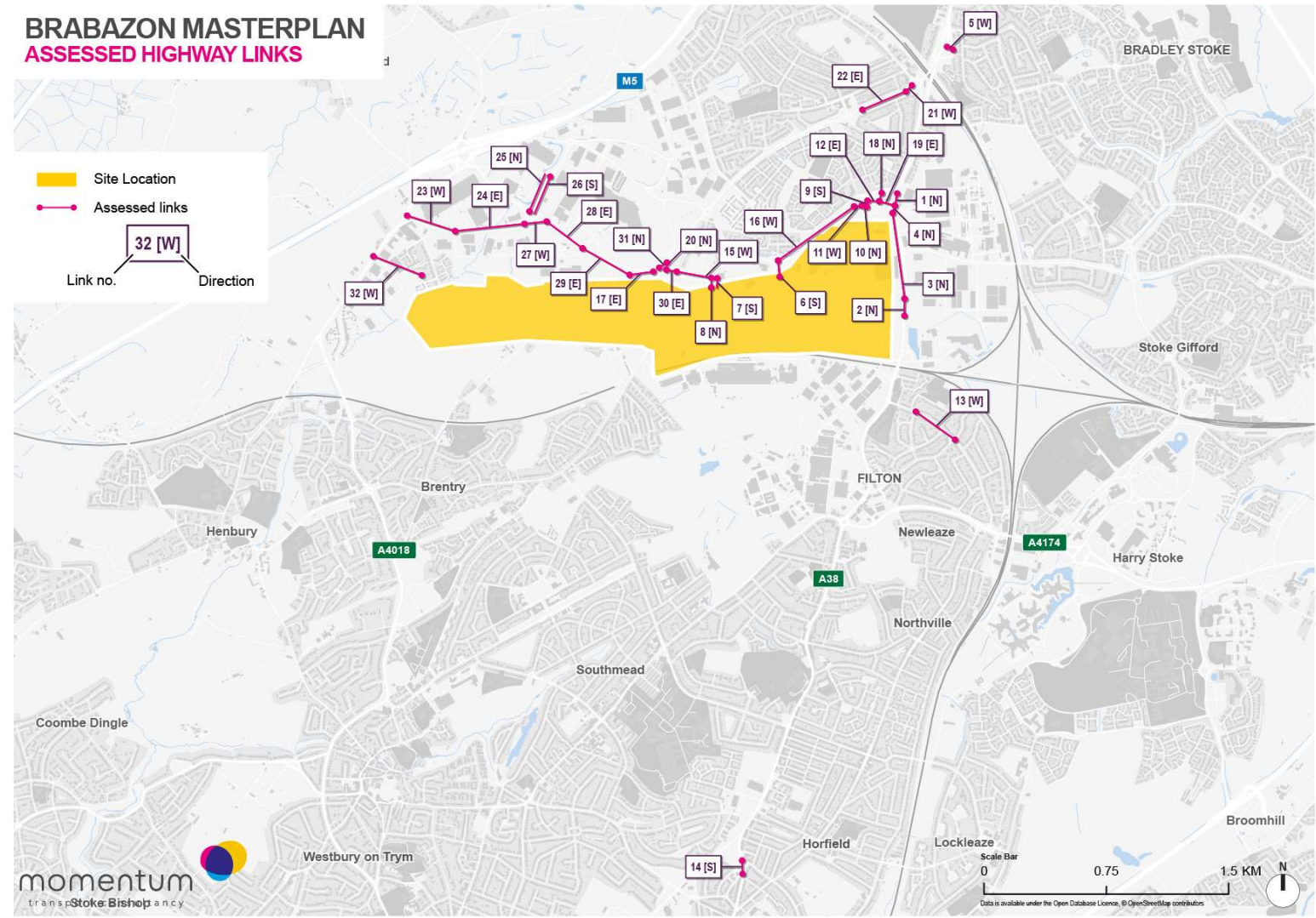
- **2036 Baseline with Proposed Development – AM peak, PM peak and PM peak with Arena trips** – three scenarios have been assessed for the public transport capacity assessment. As per the TA, a PM peak scenario with YTL Arena trips is assessed as the GBATS4 public transport model does not include public transport trips from YTL Arena as part of the background demand. The AM peak with Arena trips is not assessed as the Arena would not typically be open to visitors during this time of day and therefore no trips would be generated.

8.4.10 As stated above, the GBATS4 model has been used to acquire the baseline traffic flows for the assessment scenarios as described above. Traffic flows at the following highway links, as illustrated in **Inset Inset Figure 8.2**, have been assessed. For the purposes of this assessment, links have been selected where there is more than a 10% increase in traffic flow in the 2036 Baseline with Proposed Development (with and without Concorde Roundabout and Combination Junction) compared to the 2036 Baseline with extant planning consent. The change in traffic flow is considered across the AM peak, PM peak and AAWT (18-hour) traffic flow counts, for both the with and without Combination Junction and Concorde Roundabout options.

1. A38 (Hayes Way / Gloucester Road Gyratory) – northbound
2. A38 (North of Proposed Access) – northbound
3. A38 (South of Signalised Gyratory) – northbound
4. A38 (Hayes Way Signalised Gyratory) – northbound
5. B4057 (South of Stoke Lane) - westbound
6. Blenheim Roundabout (Site Access, Southern Arm) – southbound
7. Brabazon Roundabout (Site Access, Southern Arm) – southbound
8. Brabazon Roundabout (Site Access, Southern Arm) – northbound
9. Concorde Roundabout (Southern Arm, Site Access) – southbound
10. Concorde Roundabout (Southern Arm, Site Access) – northbound
11. Concorde Roundabout – westbound
12. Concorde Roundabout – eastbound
13. Filton Avenue – westbound
14. Gloucester Road (South of Junction with Muller Road) – southbound
15. Hayes Way (Between Brabazon Roundabout and San Andreas Roundabout) – westbound
16. Hayes Way (Between Concorde Roundabout and Blenheim Roundabout) – westbound
17. Hayes Way (Between San Andreas Roundabout and Merlin Road) – eastbound
18. Hayes Way (East of Concorde Roundabout) – northbound
19. Hayes Way / A38 Signalised Gyratory – eastbound
20. Highwood Road – northbound

21. Highwood Road (Western Arm) – eastbound
22. Highwood Road Gyratory (Western Arm) – eastbound
23. Lysander Road – westbound
24. Lysander Road - eastbound
25. Lysander Road (north of Merlin Road Roundabout) – northbound
26. Lysander Road (north of Merlin Road Roundabout) – southbound
27. Lysander Road (south of Merlin Road Roundabout) – westbound
28. Merlin road (to the east of Merlin road / Lysander Road Roundabout) – eastbound
29. Merlin Road (to the west of San Andreas roundabout) – eastbound
30. San Andreas Roundabout – eastbound
31. San Andreas Roundabout (Merlin Road to Highwood Road) – northbound
32. The Laurels – westbound

Inset Figure 8.2 Map Showing the Assessed Highway Links



- 8.4.11 Additional vehicle trips to the 2036 Baseline trips are expected to and from the Site resulting from the Proposed Development which comprises of the delivery of c.5,700 homes and a mix of commercial development and community infrastructure. The constituent elements of the 5,700 homes includes the consented level of 2,675 homes at Brabazon (Reference: P21/02390/RVC). The developments at Fishpool Hill (1,100 homes) and Haw Wood (1,000) take the consented level up to 4,775 homes, with the residual 1,000 homes coming from Patchway Trading Estate (PTE). Therefore, the total level of vehicle trips generated by the Site will be in line with the volume forecasted as part of the CPNN and extant planning consent, as Patchway Estate is located within the CPNN.
- 8.4.12 As a result, there would be no increase in overall traffic as a result of the Site densification. For this reason, although there would be varying levels of traffic flows across the Transport Phases, only one scenario will be assessed, which is a conservative assessment.
- 8.4.13 It should also be noted that whilst there is no increase in overall traffic generated by the Proposed Development, when compared to the extant planning consent, there are increases in traffic flows at particular links. This is because of the local redistribution of trips having a greater impact on some highways links compared to others, where there would be a decrease in traffic flows. As outlined in **Paragraph 8.4.10**, only highway links where there is more than a 10% increase in traffic flow in the 2036 Baseline with Proposed Development compared to the 2036 Baseline with extant planning consent has been assessed.
- 8.4.14 As part of the transport strategy, the additional densification sought within the Proposed Development will be achieved through additional public transport capacity alongside enhanced cycle and pedestrian infrastructure. Therefore, the public transport capacity assessed as part of the Proposed Development exceeds that provided within the extant planning consent.
- 8.4.15 A summary of the development proposals at each Transport Phase is shown in **Table 8.2**.

Table 8.2 Indicative Development Proposals Across Transport Phases

Land Use	Unit	Consented Outline Planning Application	Transport Phase 1	Transport Phase 2	Transport Phase 3	Transport Phase 4
C1 Hotel	Rooms	120	220	440	660	660
C3 Dwellings	Dwellings	2,675	3,675	4,072	5,325	6,500
C2 Senior Living - Extra Care	Units	N/A	229	478	478	600
E Retail	sqm	4,787	14,958	21,264	21,264	21,264
E Offices	sqm	78,030	75,770	147,042	181,406	270,000
B2 Industrial	sqm	32,130	26,019	31,465	39,210	55,000
F1 University	Sqm	N/A	11,025	34,626	34,626	55,000
Sui Generis	Rooms	N/A	737	737	1,500	1,500

Land Use	Unit	Consented Outline Planning Application	Transport Phase 1	Transport Phase 2	Transport Phase 3	Transport Phase 4
Student Accommodation						
F1 Primary School	hectares	8.28	8.28	8.28	8.28	8.28
F1 Secondary School	hectares	5	5	5	5	5

8.4.16 Effects on public transport, cycling and walking, were assessed according to the four Transport Phases, each representing different levels of public transport provision. Transport Phase 1 consists of existing committed schemes (i.e. one train per hour at North Filton Station and six metrobus buses per hour) with Transport Phase 4 to include a proposed Mass Transit Network. Additional trips generated at each Transport Phase will be accommodated through an uplift in public transport, cycling and walking, which will be in excess of the active and public transport trips included within the extant planning consent.

8.4.17 Further details of the transport measures to be delivered at each phase are provided in Section 8.5 of the Planning Statement and a summary of the public transport provision at each Transport Phase is shown in **Table 8.3**.

Table 8.3 Summary of Frequency Across the Transport Phases

Public Transport	Transport Phase 1 Committed Service Level – Consented OPA	Transport Phase 2 – Proposed Service Level	Transport Phase 3 – Proposed Service Level	Transport Phase 4 – Proposed Service Level, Max Density
Metrobus services per hour per direction	6	8	8	8
Train services per hour per direction (Bristol Temple Meads)	1*	3**	3**	3**
Train services per hour per direction (Bristol Parkway)	-	-	2**	2**
Park and Ride spaces	-	-	500	500
Mass Rapid Transit Network services	-	-	-	8

Public Transport	Transport Phase 1 Committed Service Level – Consented OPA	Transport Phase 2 – Proposed Service Level	Transport Phase 3 – Proposed Service Level	Transport Phase 4 – Proposed Service Level, Max Density
per hour per direction				

*Assumes 3 car trains

**Assumes 5 car trains

8.4.18 As indicated above, it is expected that there would be Park and Ride provision during Transport Phases 3 and 4. However, this is excluded from this assessment as the details of the Park and Ride location/s have not yet been determined. The introduction of Park and Ride trips would result in a decrease in vehicular and public transport trips to the Site and therefore a conservative scenario has been assessed by omitting it from the assessment.

8.4.19 The effect of construction on the transport network has been excluded as agreed through scoping. The Environmental Statement for the extant planning consent (PT14/3867/O) assessed the impact of construction assuming a conservative scenario of 400 construction staff on-Site across the development construction phases. This assumption remains robust and therefore the assessment of construction impacts is excluded from this chapter. No significant effects of construction and demolition were identified as part of the assessment for the extant planning consent.

Significance Criteria

8.4.20 In line with the IEMA guidelines and the current Ministry for Housing, Communities and Local Government (MHCLG) guidance on 'Travel Plans, Transport Assessments and Statements in decision-taking', this chapter provides an assessment of the transport effects likely to be relevant to the operational phases; including:

- Severance;
- Driver, pedestrians and cyclist delay;
- Pedestrian amenity;
- Fear and intimidation;
- Accidents and safety;
- Public transport capacity; and
- Public access.

8.4.21 Hazardous and dangerous loads have not been assessed, as the Site is expected to generate minimal hazardous loads throughout the construction and operational period, which would not be sufficient to warrant further impact assessment.

Severance

8.4.22 Severance is defined in the IEMA Guidelines as the "perceived division that can occur within a community when it becomes separated by a major traffic artery". This has been assessed by comparing the 2036 Baseline with Proposed Development scenarios (with and without Combination Junction and Concorde Roundabout) with the 2036 Baseline scenario.

- 8.4.23 To assess the impact of the Proposed Development on severance, the IEMA Guidelines advise that changes of traffic flows or HGV flows by 30%, 60% or 90% can be considered as having a low, medium or high impact respectively. Less than a 30% change is a negligible impact magnitude. Traffic flows extracted from GBATS4 have been used as the basis of this assessment.

Driver Delay

- 8.4.24 Driver delay refers to the time lost by drivers due to congestion on links or junctions. The IEMA Guidelines note that driver delay can occur at several points on the network, though the magnitude of impact is considered significant when the traffic on the network is predicted to be approaching capacity of individual junctions of the network.
- 8.4.25 Driver delay is subject to the same thresholds as severance with less than a 30% change in vehicle flows resulting in a negligible impact, and changes by 30%, 60% and 90% can be considered as having a low, medium or high impact, respectively. Traffic flows extracted from GBATS4 have been used as the basis of this assessment.

Pedestrian and Cyclist Delay

- 8.4.26 Paragraph 4.35 of the IEMA Guidelines note that:

“Changes in the volume, composition or speed of traffic may affect the ability of people to cross roads. In general, increases in traffic levels are likely to lead to greater increases in delay. Delays will also depend upon the general level of pedestrian activity, visibility and general physical conditions of the Site”.

- 8.4.27 Pedestrians and cyclists can experience delays on their journeys and therefore these modes are included in this assessment.
- 8.4.28 The IEMA Guidelines do not suggest any thresholds for judging significance of absolute or actual changes in levels of delay for pedestrians and cyclists, stating that *“Given the range of local factors and conditions which can influence pedestrian delay, it is not considered wise to set down any thresholds but instead it is recommended that assessors use their judgement to determine whether pedestrian delay is a significant impact”.*
- 8.4.29 The IEMA Guidelines note that pedestrian and cycle delay is affected by changes in traffic flows, composition and other local factors including pedestrian and cycle volumes and no specific threshold is provided. Therefore, professional judgement has been used to assess this effect and it has been measured at the highway links and junctions on the surrounding key pedestrian and cycle routes with references to traffic flows.

Pedestrian Amenity

- 8.4.30 Pedestrian amenity is defined in Paragraph 4.39 of the IEMA Guidelines as *“...the relative pleasantness of a journey, and is considered to be affected by traffic flow, traffic composition and pavement width/separation from traffic.”*
- 8.4.31 Amenity is affected by traffic flow and is therefore subject to the same thresholds as severance. As such, traffic flows have been used as the base of this assessment. Amenity is also affected by traffic composition and pavement width/separation from traffic and therefore a qualitative assessment of the development proposals has also be applied.

Fear and Intimidation

- 8.4.32 Within the IEMA Guidelines, fear and intimidation refers to the relationship between pedestrian and cycling infrastructure, and traffic volume and type on a given highway link. The impact of this is defined in Paragraph 4.40 of the Guidance as *“...dependent on the volume of traffic, its*

HGV composition, its proximity to people or the lack of protection caused by such factors as narrow pavement widths”.

8.4.33 An absolute change in average hourly vehicle flow of 600 – 1,200 vehicles has a low impact, 1,200 – 1,900 vehicles a medium impact and above 1,800 vehicles a high impact on fear and intimidation. As such, these thresholds have been applied for this assessment.

8.4.34 Amenity, fear and intimidation can be considered together as they are strongly interrelated.

Accidents and Safety

8.4.35 Accidents and safety have been assessed by identifying the locations that are identified to have had a notable number of collisions in the last five years. A review of Personal Injury Accident (PIA) data on the local highway network has been undertaken.

8.4.36 Paragraph 4.42 of the IEMA Guidelines state:

“Where the development is expected to produce a change in the character of the traffic, then data on existing accident levels may not be sufficient. Professional judgement will be needed to assess the implication of local circumstances, or factors which elevate or lessen risks of accidents, e.g. junction conflicts”.

8.4.37 DfT Transport Analysis Guidance (TAG) indicates that a change in accidents of less than 30% has a slight impact while a change of greater than 30% has a significant impact ('significant' in DfT terms). It has therefore assumed that a 15%, 30%, 45% and 60% increase in traffic flows would result in a minor, moderate, major and substantial impact on accidents and safety, respectively. Less than a 15% change is a negligible impact.

8.4.38 Using professional judgement, as recommended in the IEMA Guidelines, this has been considered in conjunction with a qualitative assessment of the quality of infrastructure. This enables a robust assessment by identifying the key areas of collisions within the study area, in relation to the general distribution of collisions.

Public Transport Capacity

8.4.39 This impact depends on whether routes or stop/stations are proposed to be changed or where demand for a public transport service exceeds capacity. No routes or stops/stations are proposed to be changed as part of this Proposed Development.

8.4.40 As outlined above, the demand and capacity of the public transport network varies across the Transport Phases and therefore, the available capacity that is required at each Transport Phase has been calculated using the GBATS4 model. This is then used to assess the impact of the demand generated by the Proposed Development at each Transport Phase in the AM peak, PM peak and PM peak with YTL Arena trips.

8.4.41 The IEMA Guidelines do not specify a specific threshold but for the purpose of this assessment, the magnitude of impact is considered low, medium or high if the occupancy impact on capacity is greater than 5%, 10% or 15% respectively. Less than a 5% impact is a negligible impact magnitude. This is considered alongside a qualitative assessment of the impact based on existing knowledge of the Site and the public transport networks.

8.4.42 The occupancy impact is calculated based on the percentage of total available capacity (after taking into account background demand as determined by GBATS4) that is required by the development public transport demand, as informed by the trip generation exercise. This has been calculated for each Transport Phase for bus, mass rapid transit (MRT) and rail trips.

8.4.43 It should be noted that for available bus capacity, only the metrobus service has been taken into consideration as it is the only service that is currently confirmed to run directly through the

Site. This is a reasonable conservative scenario, as in reality, bus users of the Proposed Development may use other local bus services which are in walking distance to the Site, or unconfirmed further services may pass through the Site.

Public Access

- 8.4.44 Public Access relates to the accessibility of the Site for pedestrians, cyclists and vehicles, including the presence of Public Rights of Way (PRoW) for pedestrian access. No specific threshold of assessing the impact of Public Access and PRoW is provided in the IEMA Guidelines therefore, professional judgement has been used to assess this effect based on the provision of public access points as part of the Proposed Development in comparison to what is currently provided.

Summary of Assessment Type for Each Environmental Effect

- 8.4.45 Table 8.4 provides a summary of the type of assessment (quantitative or qualitative) undertaken for each of the transport-related environmental effects listed above.

Table 8.4 Summary of Assessment Types for Each Environmental Effect

Environmental Effect	Type of Assessment
Severance	Quantitative and Qualitative
Driver, Pedestrian and Cyclist Delay	Quantitative and Qualitative
Pedestrian Amenity	Quantitative
Fear and Intimidation	Quantitative
Accidents and Safety	Quantitative and Qualitative
Public Transport Capacity	Quantitative and Qualitative
Public Access	Qualitative
Hazardous Loads	Scoped out

Magnitude of Impact Criteria

- 8.4.46 Where there are no defined thresholds of significance or impact magnitude provided in the IEMA guidelines, professional judgement and/or thresholds will be applied. Table 4.1 in this ES Statement sets out the generic significance criteria of significance and is reproduced below in Table 8.5. As shown, effects with a moderate, major or substantial significance of effect will be concluded as significant and effects with a negligible/no impact or minor significance of effect will be concluded as not significant.

Table 8.5 Significance Criteria

	Level of Effect	Criteria
<i>Significant</i>	Substantial	These effects are assigned this level of significance as they represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites and features of national or regional importance. A change at a county scale site or feature may also enter this category.
	Major	These effects are likely to be important considerations at a district scale and may become key factors in the decision-making process.
	Moderate	These effects, while important at a local scale, are not anticipated to be key decision-making issues.
<i>Not Significant</i>	Minor	These effects may be raised as local issues but are unlikely to be of importance in the decision-making process.
	Negligible or no effect	These effects are imperceptible, or within normal bounds of variation, or in the margins of forecasting errors. Such effects should not be considered by the decision-maker.

8.4.47 The above categories of magnitude of impact on each of the transport effects have been defined by the quantitative and qualitative assessments, as set out in **Table 8.6**.

8.4.48 Where the magnitude of impact is based on change in traffic flows, consideration would also be given to the actual quantum flow to caveat links where the vehicle flow is low and therefore resulting in a disproportionate impact when measured by percentage change in traffic.

Table 8.6 Magnitude of Impact and Changes in Flows for Assessing Potential Effects

Magnitude		Transport-related Environmental Effects								
	Severance	Delay			Amenity		Fear and Intimidation	Accidents and Safety	Public Access	Public Transport
		Driver	Pedestrian	Cyclist	Pedestrian	Cyclist				
Negligible	< 30% change in traffic flow	< 30% change in traffic flow	No change in pedestrian and cyclist infrastructure		< 30% change in traffic flow or no change in pedestrian and cyclist infrastructure. No change in pedestrian and cyclist infrastructure.		< 600 change in average hourly vehicle flow	<15% change in vehicle traffic at existing accident hotspots	No change in public access provision	< 5% occupancy impact
Minor	30 – 60% change in traffic flow	30 – 60% change in traffic flow	Minor change in pedestrian and cyclist infrastructure		30 – 60% change in traffic flow or minor change in pedestrian and cyclist infrastructure. Minor change in pedestrian and cyclist infrastructure.		600 – 1,200 change in average hourly vehicle flow	15 - 30% change in vehicle traffic at existing accident hotspots	Minor change in public access provision	5 – 10% occupancy impact
Moderate	60 – 90% change in traffic flow	60 – 90% change in traffic flow	Moderate change in pedestrian and cyclist infrastructure		60 – 90% change in traffic flow or moderate change in pedestrian and cyclist infrastructure. Moderate change in pedestrian and cyclist infrastructure.		1,200 – 1,800 change in average hourly vehicle flow	30 – 45% change in vehicle traffic at existing accident hotspots	Moderate change in public access provision	10 – 15% occupancy impact

Magnitude		Transport-related Environmental Effects								
	Severance	Delay			Amenity		Fear and Intimidation	Accidents and Safety	Public Access	Public Transport
		Driver	Pedestrian	Cyclist	Pedestrian	Cyclist				
Major	90 - 100% change in traffic flow	90 - 100% change in traffic flow	Major change in pedestrian and cyclist infrastructure		90 - 100% change in traffic flow or major change in pedestrian and cyclist infrastructure. Major change in pedestrian and cyclist infrastructure.	1,800 – 2,000 change in average hourly vehicle flow	45 – 60% change in vehicle traffic at existing accident hotspots	Major change in public access provision	15 - 20% occupancy impact	
Substantial	> 100% change in traffic flow	> 100% change in traffic flow	Substantial change in pedestrian and cyclist infrastructure		> 100% change in traffic flow or substantial change in pedestrian and cyclist infrastructure. Substantial change in pedestrian and cyclist infrastructure.	> 2,000 change in average hourly vehicle flow	> 60% change in vehicle traffic at existing accident hotspots	Substantial change in public access provision	> 20% occupancy impact	

Receptors and Receptor Sensitivity

- 8.4.49 In terms of transport, receptors include people that are living, visiting and using transport networks in the area, as well as the transport networks themselves. Therefore, the potential receptors for which the assessment has been undertaken relate to those people and networks in the study area.
- 8.4.50 Receptors have been defined as having a negligible, low, medium or high sensitivity based on the broad criteria for identifying receptor sensitivity shown in **Table 8.7** and summarised in Table 8.8 for this assessment. 'V/C' refers to the 'volume to capacity ratio' of a given highway link.

Table 8.7 Criteria for Receptor Sensitivity

Sensitivity	Criteria
Negligible	The receptor/resource has a very high capacity to accommodate change without significant effects arising or is of very low local importance.
Low	The receptor/resource is tolerant of change without detriment to its character or is of low or local importance.
Medium	The receptor/resource has medium capacity to absorb change without significantly altering its present character or is of high importance.
High	The receptor/resource has little ability to absorb change without fundamentally altering its present character or is of national importance.

Table 8.8 Sensitivity of Receptors

Sensitivity of Receptor	Highway Link	Public Transport	Pedestrian / Cyclist / Vehicle	Accidents and Safety
Negligible	V/C <70%	Spare capacity >15%	Very high quality of infrastructure	Qualitative based on pedestrian / cycle infrastructure, and type and frequency of accidents.
Low	V/C between 70%<80%	Spare capacity between 10%-<15%	High quality of infrastructure	
Medium	V/C between 80%<90%	Spare capacity between 5%-<10%	Average quality of infrastructure	
High	V/C>90%	Spare capacity <5%	Poor quality of infrastructure	

Vehicles and Highway Links

- 8.4.51 The assessment on highway links assesses the AM peak hour and PM peak hour traffic flow based on GBATS4 data. Links that are considered to be sensitive receptors are those with a volume to capacity ratio (V/C) of 70% or greater as this is the threshold whereby congestion will start to occur.

8.4.52 These apply to impacts on driver delay.

Pedestrians and Cyclists

8.4.53 The sensitivity of pedestrians and cyclists has been considered in terms of the quality of pedestrian and cyclist infrastructure on each of the assessed links. This applies to impacts on severance and amenity, fear and intimidation, pedestrian and cyclist delay, accidents and safety, and public access.

Public Transport

8.4.54 AM and PM peak hour public transport services have been considered to be sensitive receptors where the impact of the Proposed Development results in less than 15% of its spare capacity after background demand has been taken into account. This applies to impacts on public transport capacity.

Accidents and Safety

8.4.55 The receptor sensitivity for assessing the impact on accidents and safety would be based on a multitude of factors including the pedestrian and cycle infrastructure at the accidents location(s) and the type and frequency of the accidents recorded. Therefore, the sensitivity would be determined by a qualitative assessment of the accident data.

Significance of Effect

8.4.56 The determination of the likely effects is set out in the matrix in **Table 8.9** which combines the magnitude of impact (**Table 8.6**) and sensitivity of receptors (**Table 8.8**). The matrix has been developed for a robust analysis that applies both the receptor sensitivity and magnitude of impact for each environmental impact assessed.

Table 8.9 Significance of Effect - Assessment Matrix

Magnitude of Impact	Receptor Sensitivity			
	Negligible	Low	Medium	High
Negligible	Negligible	Negligible	Negligible	Negligible
Minor	Negligible	Minor Adverse / Beneficial	Minor Adverse / Beneficial	Moderate – Minor Adverse / Beneficial
Moderate	Negligible	Minor Adverse / Beneficial	Moderate – Minor Adverse / Beneficial	Major – Moderate Adverse / Beneficial
Major	Negligible	Moderate – Minor Adverse / Beneficial	Major – Moderate Adverse / Beneficial	Major Adverse / Beneficial
Substantial	Minor Adverse / Beneficial	Major – Moderate Adverse / Beneficial	Major Adverse / Beneficial	Substantial Adverse / Beneficial

- 8.4.57 Where the matrix results in two options (e.g. moderate or minor), professional judgement is applied to assess the quality of the infrastructure and/or nature of the assessment location to determine the resulting receptor sensitivity and therefore if the impact is significant or not significant.

Effect Duration and Nature

- 8.4.58 Predicted environmental effects are classified as temporary or permanent.
- 8.4.59 For the environmental effects assessed in this chapter, permanent changes are those associated with the operational effects, which are irreversible (e.g. permanent land take), will last for the foreseeable future (e.g. noise from generated road traffic) or are effects considered to last greater than ten years. Temporary changes are defined by their timescales: short (<2 years), medium (2 – 5 years) or long term (5+ years).
- 8.4.60 Temporary, short and medium-term effects are those associated with demolition and construction effects and permanent and long-term effects are those associated with the Proposed Development once completed and operational.
- 8.4.61 Direct effects are caused by activities which are an integral part of the scheme whilst indirect effects are due to activities that are not part of the scheme (e.g. regeneration benefits attributable to the scheme). Further, secondary effects are induced from a different effect (e.g. introduction of shared cycle infrastructure due to increase cyclist demand).
- 8.4.62 There may also be cumulative effects which are a set of effects that singly are not significant, but when assessed together may be significant. Cumulative effects are inherently considered within this assessment as the GBATS4 Transport Model includes the cumulative developments set out in **Section 5.11**.

Geographical Extent Scale

- 8.4.63 The scale of the geographical extent is defined as follows:
- 'Local' effects: Effects to receptors neighbouring the Site of the Proposed Development.
 - 'District' effects: Effects to receptors in the administrative area where the Site of the Proposed Development is located (i.e. within the boundaries of South Gloucestershire Council or Bristol City Council).
 - 'Sub-Regional' effects: Effects to receptors in adjoining administrative areas.
 - 'Regional' effects: Effects to receptors across Greater Bristol Area as a whole.
 - 'National' effects: Effects to receptors in other parts of the UK, or the UK as a whole.
 - 'International' effects: Effects to receptors across national boundaries.

Limitations

- 8.4.64 The assessment of the 2036 Baseline and 2036 Baseline with Proposed Development scenarios is based on the latest data available at the time of the submission of the planning application.
- 8.4.65 It should be noted that the GBATS4 model which forms the basis of the traffic flow data was last calibrated in 2015 and therefore there has been some consented developments since then. However, these have been reviewed and would not have a material effect on the transport network. The impact on public transport from the neighbouring YTL Arena

(Reference: 19/05822/K) has been taken into consideration separately for the public transport impact assessment.

- 8.4.66 GBATS4 is a new model to GBATS3 and it is based on a new set of assumptions and baseline traffic data. This means that the assessment undertaken for the consented scheme is not directly comparable to this assessment.
- 8.4.67 Peak hour traffic levels have generally returned to pre-Covid levels but there may be some day-to-day variations remaining. However, as GBATS4 is based on pre-Covid traffic levels the assessment presented within this chapter is considered to be robust.

Densification Strategy

- 8.4.68 It should be noted that as part of the proposed densification strategy, this OPA is seeking consent for the development proposals with a condition restricting delivery of Transport Phases 2 to 4 until a new ES is submitted in respect of each phase. Therefore, the public transport capacity at Transport Phases 2, 3 and 4 would be reassessed through a new ES prior to the development associated with Transport Phase 2 onwards being delivered.
- 8.4.69 As discussed with SGC during the pre-application stage and further detailed in the TA (Appendix C.1), the densification is to be achieved through modal shift from car use to sustainable modes of transport, through introducing additional public and active modes of travel. Additional public transport services are proposed to achieve the maximum levels of densification and the measures include increasing the frequency of the MetroBus and the train services to North Filton Station. Therefore, the frequency of services proposed for Transport Phases 2, 3 and 4 at this stage are indicative and would be reassessed.

8.5 Baseline Conditions

Existing Baseline Conditions

- 8.5.1 This section provides an overview of the baseline transport conditions of the study area, considering the existing highway network and accessibility for all modes of transport. A full description of the Site is included in the TA (**Appendix C.1**). Two baseline conditions are considered, the first is the Site in its current state and the second is the Site in 2036 with the extant planning consent.
- 8.5.2 For the purpose of this chapter, the existing baseline is described without the infrastructure currently delivered as part of Brabazon Phase 1.

Existing Site Access

- 8.5.3 The existing Filton Airfield Site has one access provided via the Combination Junction, which links the Site to the A38 Gloucester Road. The A38 is linked to both the M4 and M5 to the north and Bristol City Centre to the south.
- 8.5.4 The existing Site does not have an internal highway network and through-movement across the Site is prohibited to the public. The Site is bounded by Hayes Way and Merlin Road to the north, A38 Gloucester Road to the east, a railway line to the south and the A4018 to the west.

Walking

- 8.5.5 The Site is largely inaccessible to pedestrians travelling from the city centre or mainline rail station. The Site is located approximately 8km from Bristol city centre, 1.6km from Patchway Station and 2.5km from Parkway Station.

- 8.5.6 Pedestrian footways connecting the Site towards central Bristol are provided on the A38 and B4057.
- 8.5.7 On the western side of the A38, a shared pedestrian / cycleway is provided, while on the eastern side a pedestrian footway is provided. The cycleway is provided from the junction of the A38 / Filton Avenue in the south to the B4057 in the north.
- 8.5.8 Signalised pedestrian crossings, with dropped kerbs and tactile paving, are provided along Gloucester Road at the following junctions:
- Gloucester Road / North Way
 - Gloucester Road / Cleve Road
 - Gloucester Road / Filton Avenue
- 8.5.9 As shown in **Appendix B.1 (Figure 7.7)**, there are 23 PRoW within the surrounding area, of which OAY/81, OAY/85 and OAY/86 connect to OAY/84 which runs in an east-west direction within the Site boundary. These footpaths form the existing points of pedestrian public access to the Site.

Cycling

- 8.5.10 To the east of the Site, a cycle lane is provided at grade with the footway along the A38 Gloucester Road which then merges onto the B4057 towards Hayes Way.
- 8.5.11 To the west of the Site, a shared pedestrian and cycle lane is provided along the A4018 towards Lysander Road.
- 8.5.12 The cycle lanes on the A38 and A4018 connect cyclists to central Bristol. Additionally, these lanes are part of the National Cycle Network (NCN), a network that consist of signed walking and cycling paths across cities in the UK.

Public Transport – Bus

- 8.5.13 The Site is currently served by a number of bus services via bus stops at Cribbs Causeway and on the A38. The bus stops at Cribbs Causeway can be accessed via Hayes Way, using the signalised pedestrian crossing to access the pedestrian footway on north side of Hayes Way which connects to Cribbs Causeway. The bus stops on the A38 are accessed via signalised pedestrian crossings on the A38.
- 8.5.14 Table 8.10 shows the bus services within the vicinity of the Site and the associated average AM peak hour (08:00 – 09:00) and PM peak hour (17:00 – 18:00) frequencies. This has been extracted from the TravelWest website at the time of writing and is subject to alter based on any timetable updates.

Table 8.10 Bus Services within the Vicinity of the Site

Bus no.	Bus Stop	Distance from Site (km)	AM Peak Hour (08:00 – 09:00) Frequency	PM Peak Hour (17:00 – 18:00) Frequency
1	Retail Park, Cribbs Causeway	1.5	4	8
2			2	4

Bus no.	Bus Stop	Distance from Site (km)	AM Peak Hour (08:00 – 09:00) Frequency	PM Peak Hour (17:00 – 18:00) Frequency
3			2	3
4			2	4
75	Cribbs Causeway Bus Station (A, B, C, H)	0.5	4	8
12 (Severn Beach)			1	1
12 (Aztec West)			1	1
12 (Little Stoke)			1	1
T2			0	4
T7			1	4
Y6			1	1
T2	Filton College / Cleve Road	0.9	1	2
Y6			1	2
3X			0	2
680			0	1
62			0	1
Total			21	55

Public Transport – Rail

- 8.5.15 The Site is in closely proximity to Patchway Station and Bristol Parkway Station. Patchway Station is located 1.6km from the Site and Bristol Parkway Station is located 2.5km away.
- 8.5.16 Both stations are served by Great Western Railway and CrossCountry services. Patchway Station provides services to and from stations between Cardiff Central and Taunton, with occasional services to Exeter St Davids and Plymouth. Parkway Station provides a greater range of services including train services towards Swansea, London and Aberdeen.
- 8.5.17 Table 8.11 shows the service frequencies in each direction during the AM and PM peak hours at these stations.

Table 8.11 Rail Frequencies at Patchway Station and Bristol Parkway Station in the AM and PM Peak Hours

Station	Distance from Site (km)	Operator	Destination	AM Peak Hour (08:00 - 09:00) Frequency	PM Peak Hour (17:00 – 18:00) Frequency
Patchway Station	1.6	Great Western Railway	Cardiff Central	1	1
			Taunton	1	1
Bristol Parkway Station	2.5	Great Western Railway	Swansea	1	2
			Westbury	1	1
			London Paddington	3	1
			Weymouth	1	1
			Gloucester	1	1
			Weston-Super-Mare	1	0
		Cross Country	Exeter St Davids	1	2
			Leeds	1	1
Total frequency per hour at Parkway and Patchway Stations				12	11

Road Network

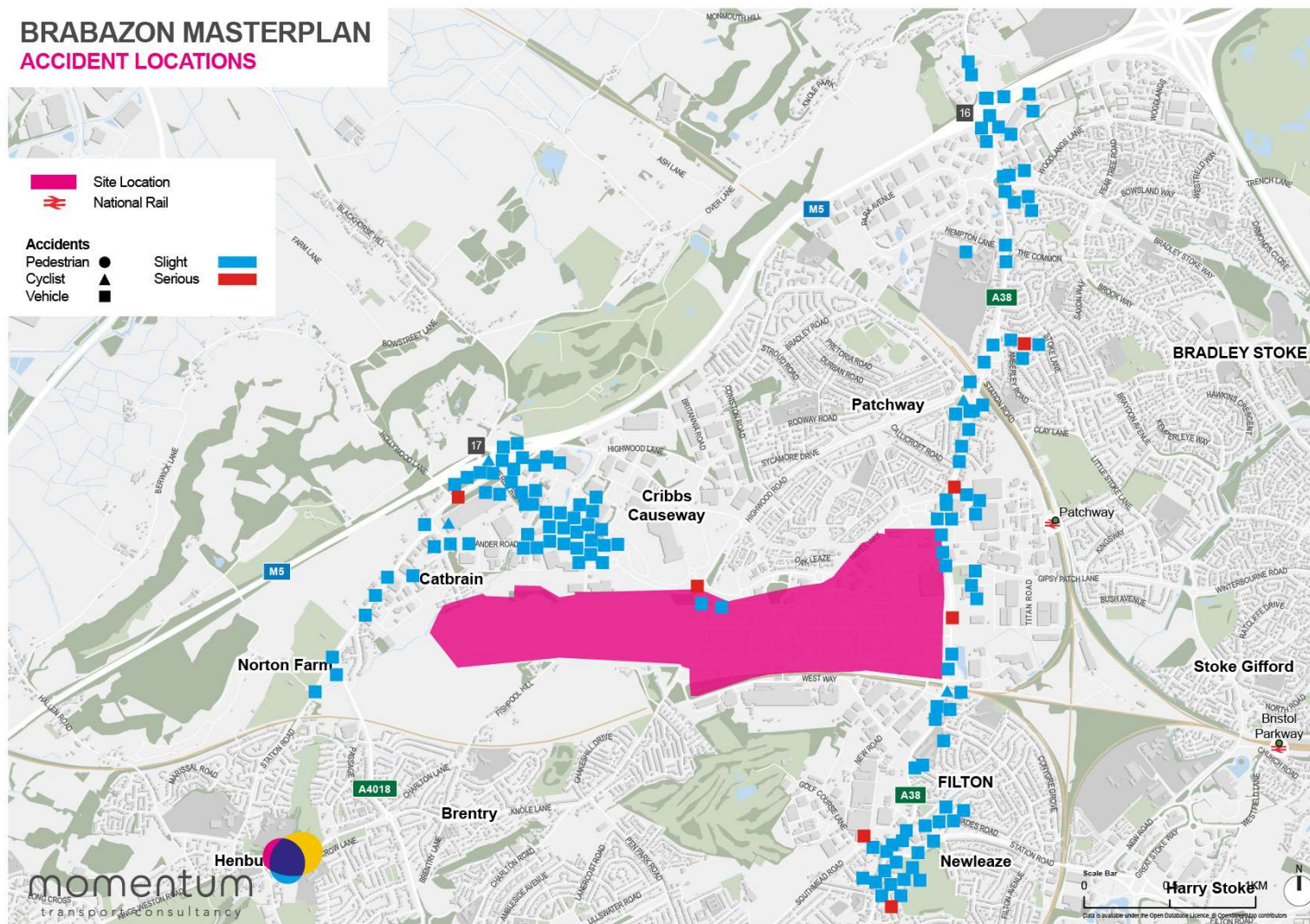
- 8.5.18 To the east of the Site is the A38 Gloucester Road which connects the Site with Bristol City Centre to the South and Gloucestershire (via the M5) to the north. Combination Junction provides access to the Site from the A38 although only vehicles approaching from the north can access the junction but vehicles departing the Site can head both north and south on the A38.
- 8.5.19 To the north of the Site is Hayes Way, which runs in an east to west direction and connects the A38 Gloucester Road in the east to the M5 (Junction 17) in the west. Concorde Roundabout is located on Hayes Way to the north east of the Site but is not used as an access in the existing baseline.
- 8.5.20 To the northwest of the Site is Merlin Road, which is linked to the A4018 and M5.
- 8.5.21 To the south of the Site is Charlton Road, which gives access to West Way. Access to West Way is to be managed and restricted to Airbus and approved event-related traffic to the Arena through the use of bus gates. This is being secured as part of the planning conditions of the Arena planning permission and would be implemented prior to the Arena opening which is anticipated to be in 2024.

- 8.5.22 The Site is well connected beyond Bristol and the surrounding areas. In particular, both the M4 and M5 connect the Site with South Wales, Somerset, Devon, London, Wiltshire and the Midlands.

Accidents and Collisions

- 8.5.23 Accident and collisions data recorded within the vicinity of the Site for the five year period from 1st November 2016 to 30th November 2021 (the most recent data available) has been obtained from South Gloucestershire Council and is included in Appendix A of the TA (**Appendix C.1**).
- 8.5.24 A review of the casualties on the local highway network surrounding the Site has been undertaken to determine the severity and casualties involved.
- 8.5.25 A total of 145 collisions were recorded in the study area, of which seven (or 5%) were serious and the remaining 138 (or 95%) were slight. No fatalities were recorded in the study area during the study period.
- 8.5.26 **Inset Inset Figure 8.3** shows the locations of accidents within the five year period. In the Site vicinity, a notable number of collisions have taken place on and around the Cribbs Causeway interchange, the junction of Merlin Road and Lysander Road and Filton Roundabout on the A38. Based on professional judgement and review of the distribution of collisions within the study area, these form the locations to be assessed with regards to accidents and collisions.

Inset Figure 8.3 Accident Locations



2036 Baseline Conditions (Future Baseline)

Site Access

- 8.5.27 In addition to the existing Combination Junction access, the 2036 baseline condition with the extant planning consent provides access from Hayes Way to the north of the Site, via Brabazon Roundabout and Blenheim Roundabout, and via a new signalised junction on the A38 to the east of the Site. In addition, modifications to San Andreas Roundabout on Hayes Way will provide an additional southern arm for buses only.
- 8.5.28 The Site in the 2036 baseline would have a primary route network, consisting of a network of roads with carriageway widths with minimum 6.5m throughout the Site. The primary route links with access junctions (A38, Blenheim Roundabout, Brabazon Roundabout) via routes along and across the Site.

Walking

- 8.5.29 The surrounding pedestrian network in the 2036 Baseline remains the same as what is set out above for the Existing Baseline.
- 8.5.30 For the internal pedestrian network, the 2036 Baseline features a dense, high-quality network of pedestrian routes across the Site. As per the extant planning consent, pedestrian footways will typically be 3m wide along the primary route network. Based on this, the walking catchment of the Site is shown in **Inset Inset Figure 8.4**.

Cycling

- 8.5.31 The surrounding cycle network in the 2036 Baseline remains the same as what is set out above for the Existing Baseline.
- 8.5.32 For the internal cycling network, the 2036 Baseline features a high-quality, dense network of cycle routes across the Site. Segregated cycle facilities would be provided along the primary road network in the form of directional 1.5m wide cycle tracks or 3m wide bi-directional tracks. Along secondary roads, cycle provision will be provided on a shared path along one side of the link, which would have a minimum width of 4m. Based on this, the cycling catchment of the Site is shown in **Inset Figure 8.5**.

Public Transport – Bus

- 8.5.33 In addition to the local bus services listed above in Table 8.10, the 2036 Baseline supports the introduction of a new bus only route through the Site between Combination Junction and San Andreas Roundabout which will form part of the proposed MetroBus extension between Parkway Station and Cribbs Causeway. It is proposed that two MetroBus interchanges are provided within the Site.

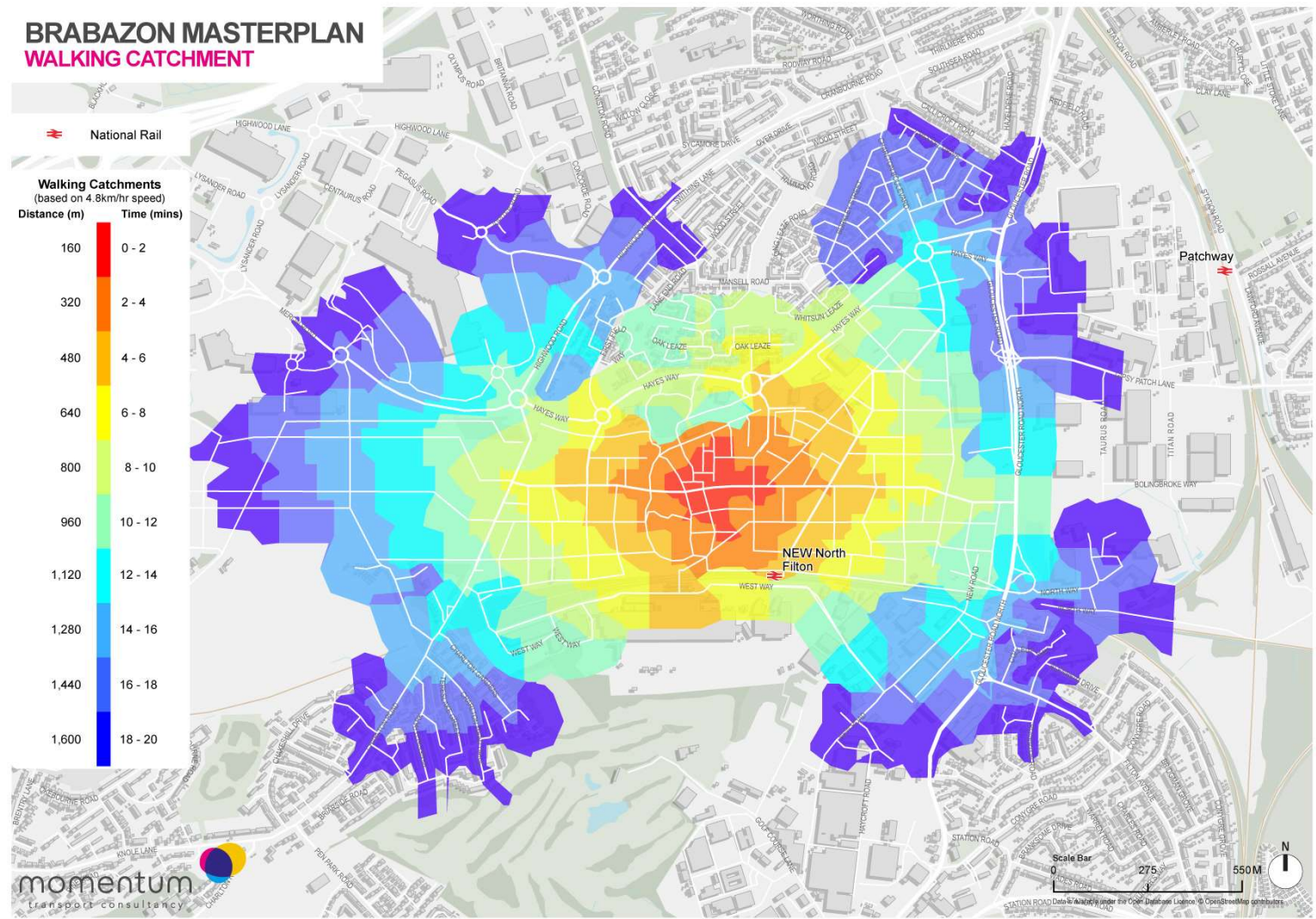
Public Transport - Rail

- 8.5.34 In addition to the local rail services listed above in Table 8.11, the 2036 Baseline includes a safeguarded area of land for the construction of the new North Filton railway station and associated facilities. The station will be delivered as part of the MetroWest 2 package and in the 2036 Baseline scenario would see the introduction of an hourly train service on the Henbury Line, serving Henbury station in the westbound direction and Bristol city centre in the eastbound direction.

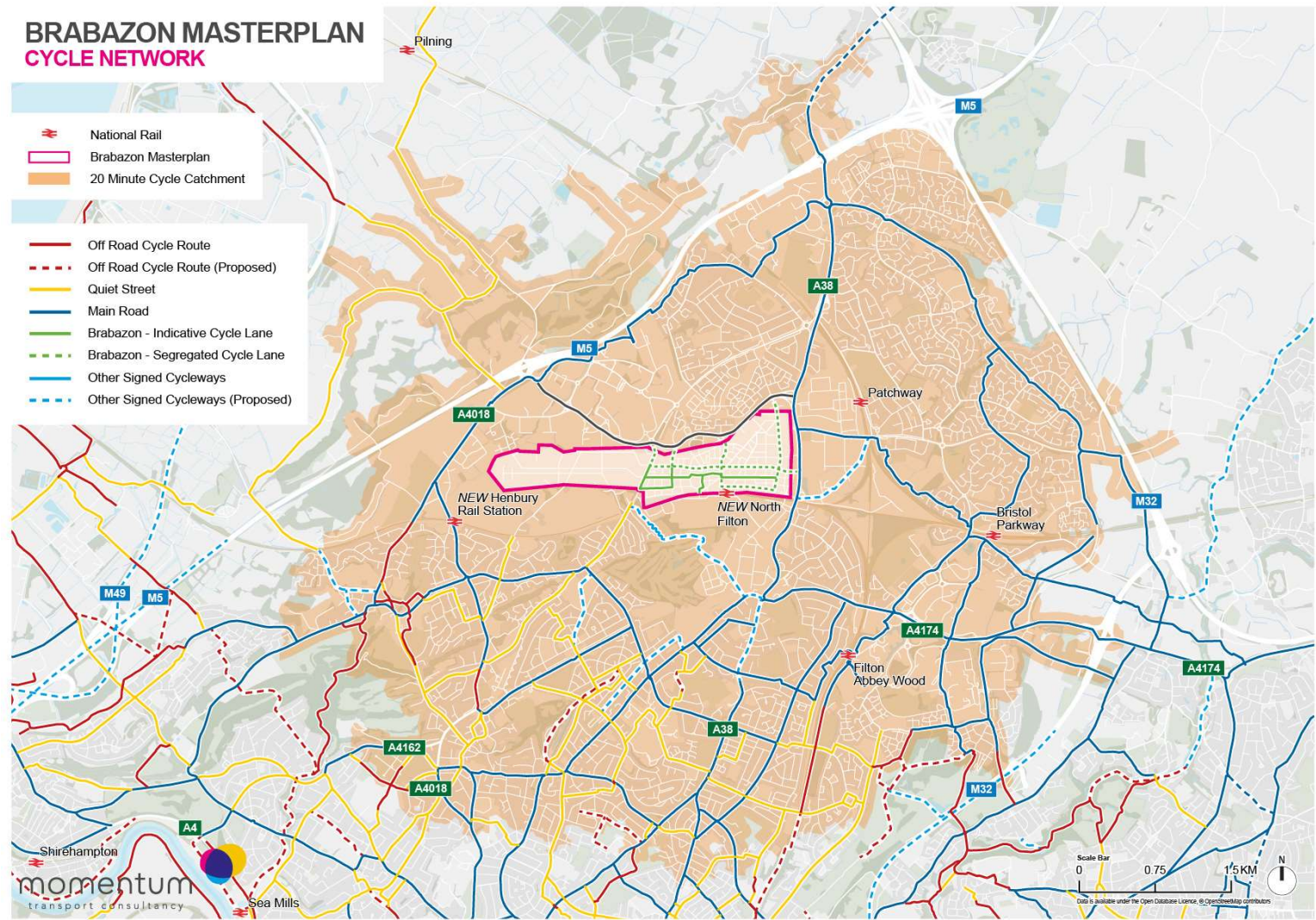
Road Network

- 8.5.35 The surrounding road network in the 2036 Baseline remains the same as what is set out above for the Existing Baseline.

Inset Figure 8.4: 2036 Baseline Walking Catchment



Inset Figure 8.5: 2036 Baseline Cycling Catchment



Baseline Evolution

- 8.5.36 The evolution of the existing and 2036 baseline scenario without the Proposed Development is captured in the GBATS4 model, with regards to the growth in number of vehicular trips and trips on the public transport network. The model incorporates the anticipated future trends in traffic growth and public transport usage.
- 8.5.37 It should be noted that the 2036 Baseline with Proposed Development, as defined by GBATS4, takes into account committed developments and therefore these developments are not reported separately in a cumulative effects assessment and are included in the 2036 Baseline. A list of these cumulative developments is presented in **Table 5.3** in **Chapter 5 (Assessment Methods)** of the ES. However, this excludes public transport trips generated by the YTL Arena and therefore these have been incorporated into the public transport capacity assessment separately, based on the trip generation in the consented application (Planning Application Reference: 19/05500/P).
- 8.5.38 In a 'no development' scenario, the Site would reflect the 2036 Baseline scenario as outlined above, with the proposed transport infrastructure and provision delivered as part of the extant planning consent.
- 8.5.39 In particular, the extant planning consent enhances the existing baseline through the provision of additional vehicular accesses into the Site and high-quality pedestrian and cycle routes, enhancing the overall permeability of the Site. The 2036 Baseline also accommodates for the metrobus route extension and the new North Filton railway station, increasing the Site's level of public transport accessibility.

8.6 Embedded Mitigation

- 8.6.1 No embedded mitigation measures, as detailed in **Chapter 3 (Proposed Development)** of the ES, are identified to be directly relevant to the environmental impacts discussed in this chapter. However, a set of proposals being delivered as part of planning applications that are linked to the extant planning consent, which impact the effects assessed in this chapter are outlined below.
- 8.6.2 As part of the Brabazon Masterplan Eastern framework proposals, a Design Code was submitted in 2021 which outlines the design framework for the Eastern Framework, including details for the internal highway network, micromobility hub, strategy for cycle parking spaces and a high-level car parking strategy. These proposals would be secured as part of the extant planning consent and therefore considered as part of the 2036 Baseline with Proposed Development.
- 8.6.3 To meet the Design Code's objective of encouraging people to walk, two major pedestrian boulevards have been proposed. These boulevards will connect all the key areas within the masterplan and create a network of car-free routes. The Design Code also outlines the key design principles for the roads throughout the road Masterplan, which include the following:
- Segregated cycle lanes to be provided with a width of 1.5m
 - Pedestrian footways to be provided with a minimum width of 2.75m
- 8.6.4 As part of this submission, amendments were also made to reflect the revised Cribbs Patchway MetroBus Extension route through the Site, amending the access route from Combination Junction to the new Brabazon Masterplan entrance on the A38.
- 8.6.5 Following the Design Code submission, a Reserved Matters Application (RMA) (Reference: P21/05318/RM) was submitted to seek approval to develop the primary highway infrastructure through the Masterplan in line with the submitted Design Code. This application is pending decision and forms the basis for the 2036 Baseline with Proposed Development.

8.7 Assessment of Likely Effects – Proposed Development (Proposed Development with Combination Junction and Concorde Roundabout)

Demolition and Construction

8.7.1 As set out in **Section 8.4**, the assessment of construction effects is scoped out of this chapter.

Operational Development

8.7.2 The potential effects of the Proposed Development have been determined by comparing the 2036 Baseline traffic and public transport flows with the 2036 Baseline with Proposed Development traffic and public transport flows. For driver delay, severance, the assessments have been undertaken for the AM peak hour and PM peak hour vehicle flows based on GBATS4 data.

8.7.3 For all the effects assessed, the impact would be direct and long-term. The effects on severance, amenity, delay fear and intimidation and accidents and safety would be local whilst the impact on public transport capacity would be district-wide.

8.7.4 The impact of additional vehicle movements on the study area as a result of the Proposed Development is summarised below in **Table 8.12** and **Table 8.13** for the AM peak and PM peak, respectively. Percentage change in traffic flows that are not negligible (greater than 30%) are highlighted in orange.

Table 8.12: 2036 Baseline vs. 2036 Baseline with Proposed Development – AM Peak Traffic Flows

Link	Direction	AM Peak (08:00 – 09:00)			
		2036 Baseline	2036 Baseline with Proposed Development	Vehicle Increase	% Change*
A38 (Hayes Way / Gloucester Road Gyratory)	NB	774	784	10	1%
A38 (North of Proposed Access)	NB	1504	1524	20	1%
A38 (South of Signalised Gyratory)	NB	983	1031	48	5%
A38 / Hayes Way Signalised Gyratory	NB	983	1031	48	5%
B4057 (South of Stoke Lane)	WB	190	222	32	17%
Blenheim Roundabout (Site Access, Southern Arm)	SB	271	317	46	17%

Link	Direction	AM Peak (08:00 – 09:00)			
		2036 Baseline	2036 Baseline with Proposed Development	Vehicle Increase	% Change*
Brabazon Roundabout (Site Access, Southern Arm)	SB	42	188	145	343%
Brabazon Roundabout (Site Access, Southern Arm)	NB	125	322	197	157%
Concorde Roundabout	WB	1135	1197	62	5%
Concorde Roundabout	EB	1083	1282	199	18%
Concorde Roundabout (Southern Arm, Site Access)	SB	18	319	301	1683%
Concorde Roundabout (Southern Arm, Site Access)	NB	8	86	79	1045%
Filton Avenue	WB	28	38	10	36%
Gloucester Road (South of Junction with Muller Road)	SB	526	524	-2	0%
Hayes Way (Between Brabazon Roundabout and San Andreas Roundabout)	WB	1422	1651	229	16%
Hayes Way (Between Concorde Roundabout and Blenheim Roundabout)	WB	1135	1197	62	5%
Hayes Way (Between San Andreas Roundabout and Merlin Road)	EB	815	986	171	21%
Hayes Way (East of Concorde Roundabout)	NB	42	47	5	12%

Link	Direction	AM Peak (08:00 – 09:00)			
		2036 Baseline	2036 Baseline with Proposed Development	Vehicle Increase	% Change*
Hayes Way / A38 Signalised Gyratory	EB	356	525	168	47%
Highwood Road	NB	1060	1322	262	25%
Highwood Road (Western Arm)	WB	293	325	31	11%
Highwood Road Gyratory (Western Arm)	EB	271	302	31	12%
Lysander Road	WB	302	368	66	22%
Lysander Road	EB	577	644	67	12%
Lysander Road (north of Merlin Road Roundabout)	NB	165	106	-59	0%
Lysander Road (north of Merlin Road Roundabout)	SB	414	495	81	20%
Lysander Road (south of Merlin Road Roundabout)	WB	175	280	105	60%
Merlin road (to the east of Merlin road / Lysander Road Roundabout)	EB	878	1006	128	15%
Merlin Road (to the west of San Andreas roundabout)	EB	781	924	143	18%
San Andreas Roundabout	EB	1422	1651	229	16%
San Andreas Roundabout (Merlin Road to Highwood Road)	NB	876	1097	222	25%
The Laurels	WB	214	225	11	5%

*The analysis has rounded % change to the nearest whole number

Table 8.13: 2036 Baseline vs. 2036 Baseline with Proposed Development – PM Peak Traffic Flows

Link	Direction	PM Peak (08:00 – 09:00)			
		2036 Baseline	2036 Baseline with Proposed Development	Vehicle Increase	% Change*
A38 (Hayes Way / Gloucester Road Gyratory)	NB	629	716	87	12%
A38 (North of Proposed Access)	NB	1321	1542	221	14%
A38 (South of Signalised Gyratory)	NB	899	1109	210	19%
A38 / Hayes Way Signalised Gyratory	NB	899	1109	210	19%
B4057 (South of Stoke Lane)	WB	212	229	17	8%
Blenheim Roundabout (Site Access, Southern Arm)	SB	187	329	141	43%
Brabazon Roundabout (Site Access, Southern Arm)	SB	271	210	-61	-29%
Brabazon Roundabout (Site Access, Southern Arm)	NB	120	305	185	61%
Concorde Roundabout	WB	1647	1872	225	12%
Concorde Roundabout	EB	1512	1747	235	13%
Concorde Roundabout (Southern Arm, Site Access)	SB	10	145	134	93%
Concorde Roundabout (Southern Arm, Site Access)	NB	74	134	60	45%
Filton Avenue	WB	19	21	2	9%

Link	Direction	PM Peak (08:00 – 09:00)			
		2036 Baseline	2036 Baseline with Proposed Development	Vehicle Increase	% Change*
Gloucester Road (South of Junction with Muller Road)	SB	256	277	21	7%
Hayes Way (Between Brabazon Roundabout and San Andreas Roundabout)	WB	879	974	95	10%
Hayes Way (Between Concorde Roundabout and Blenheim Roundabout)	WB	1647	1872	225	12%
Hayes Way (Between San Andreas Roundabout and Merlin Road)	EB	1133	1163	30	3%
Hayes Way (East of Concorde Roundabout)	NB	138	147	9	6%
Hayes Way / A38 Signalised Gyratory	EB	685	906	221	24%
Highwood Road	NB	757	831	73	9%
Highwood Road (Western Arm)	WB	551	577	25	4%
Highwood Road Gyratory (Western Arm)	EB	524	549	25	5%
Lysander Road	WB	1119	1170	51	4%
Lysander Road	EB	1320	1376	56	4%
Lysander Road (north of Merlin Road Roundabout)	NB	384	428	44	10%
Lysander Road (north of Merlin Road Roundabout)	SB	587	576	-10	-2%

Link	Direction	PM Peak (08:00 – 09:00)			
		2036 Baseline	2036 Baseline with Proposed Development	Vehicle Increase	% Change*
Lysander Road (south of Merlin Road Roundabout)	WB	784	807	23	3%
Merlin road (to the east of Merlin road / Lysander Road Roundabout)	EB	1903	1915	12	1%
Merlin Road (to the west of San Andreas roundabout)	EB	1464	1480	16	1%
San Andreas Roundabout	EB	879	974	95	10%
San Andreas Roundabout (Merlin Road to Highwood Road)	NB	1228	1287	60	5%
The Laurels	WB	204	284	80	28%

**The analysis has rounded % change to the nearest whole number*

- 8.7.5 The impact of public transport trips resulting from the Proposed Development on the study area is assessed for each of the Transport Phases outlined above, and summarised below in **Error! Reference source not found.** for the AM peak (08:00 – 09:00), **Error! Reference source not found.** for the PM peak (17:00 – 18:00) and **Error! Reference source not found.** for the PM peak with Arena trips (17:00 – 18:00).

Table 8.14 2036 Baseline vs Proposed Development Public Transport Trips in the AM Peak (08:00 – 09:00)

Mode		Transport Phase 1		Transport Phase 2		Transport Phase 3		Transport Phase 4	
		EB	WB	EB	WB	EB	WB	EB	WB
Metrobus	2036 Baseline	49	41	66	55	66	55	66	55
	Development Trips	178	134	332	256	434	334	275	230
MRT*	2036 Baseline	0	0	0	0	0	0	49	41
	Development Trips	0	0	0	0	0	0	178	134
Rail	2036 Baseline	52	34	156	102	260	170	260	170
	Development Trips	121	184	304	655	776	986	768	1522

*MRT network applicable to Transport Phase 4 only

Table 8.15 2036 Baseline vs Proposed Development Public Transport Trips in the PM Peak (17:00 – 18:00)

Mode		Transport Phase 1		Transport Phase 2		Transport Phase 3		Transport Phase 4	
		EB	WB	EB	WB	EB	WB	EB	WB
Metrobus	2036 Baseline	39	48	52	64	52	64	52	64
	Development Trips	123	210	207	368	267	471	206	253
MRT*	2036 Baseline	0	0	0	0	0	0	130	260
	Development Trips	0	0	0	0	0	0	733	902
Rail	2036 Baseline	26	57	78	171	130	285	130	285
	Development Trips	129	72	594	223	998	627	1383	636

*MRT network applicable to Transport Phase 4 only

Table 8.16: 2036 Baseline vs Proposed Development Public Transport Trips in the PM Peak with Arena (17:00 – 18:00)

Mode		Transport Phase 1		Transport Phase 2		Transport Phase 3		Transport Phase 4	
		EB	WB	EB	WB	EB	WB	EB	WB
Metrobus	2036 Baseline	39	48	52	64	52	64	52	64
	Development Trips	163	260	247	417	330	548	233	286
MRT*	2036 Baseline	0	0	0	0	0	0	130	260
	Development Trips	0	0	0	0	0	0	830	1022
Rail	2036 Baseline	26	57	78	171	130	285	130	285
	Development Trips	246	189	711	340	1115	972	1500	981

*MRT network applicable to Transport Phase 4 only

Severance

- 8.7.6 For assessing the impact on severance, the receptor would be pedestrians that are living in or visiting the study area. As shown in **Table 8.8**, the sensitivity of pedestrians is based on the level of infrastructure provided at the respective links. The new highway links that will be constructed as part of the Proposed Development have segregated footways and designated pedestrian crossings within a reasonable walking distance and on desire lines. Desire lines describe the path which represents the shortest or most easily navigated route between an origin and destination.
- 8.7.7 This new pedestrian infrastructure is therefore considered to be of very high quality and as a result, pedestrians would have a negligible sensitivity. The sensitivity of pedestrians at links on existing highways is determined on a case-by-case basis as detailed below for links where there is a notable magnitude of impact.
- 8.7.8 Error! Reference source not found. **Table 8.12** and Error! Reference source not found. **Table 8.13** show that in the peak hours, most of the links assessed would have a negligible change in vehicle flows (less than 30%) as a result of the Proposed Development, which represents a negligible magnitude of change. For the seven links in the AM peak and four links in the PM peak where the increase in vehicle movements is more than 30%, the magnitude of impact ranges from minor to substantial. These links and their resulting significance of effect are listed in **Table 8.17** Error! Reference source not found. for the AM peak and in **Table 8.18** Error! Reference source not found. for the PM peak.
- 8.7.9 Where the significance of effect, based on the matrix, is either minor or moderate, professional judgement of traffic conditions on the link has been applied to determine the resulting significance of effect.

Table 8.17 Links in the AM Peak with an Increase in Vehicle Movements of more than 30%

Link	Direction	% Change	Magnitude of Impact	Receptor Sensitivity	Significance of Effect
Brabazon Roundabout (Site Access, Southern Arm)	SB	343%	Substantial	Negligible	Minor Adverse
Brabazon Roundabout (Site Access, Southern Arm)	NB	157%	Substantial	Negligible	Minor Adverse
Concorde Roundabout (Southern Arm, Site Access)	SB	1683%	Substantial	Negligible	Minor Adverse
Concorde Roundabout (Southern Arm, Site Access)	NB	1045%	Substantial	Negligible	Minor Adverse
Filton Avenue	WB	36%	Minor	Low	Minor Adverse
Hayes Way / A38 Signalised Gyratory	EB	47%	Minor	Low	Minor Adverse

Link	Direction	% Change	Magnitude of Impact	Receptor Sensitivity	Significance of Effect
Lysander Road (south of Merlin Road Roundabout)	WB	60%	Moderate	Medium	Minor Adverse

Table 8.18 Links in the PM Peak with an Increase in Vehicle Movements of more than 30%

Link	Direction	% Change	Magnitude of Impact	Receptor Sensitivity	Significance of Effect
Blenheim Roundabout (Site Access, Southern Arm)	SB	43%	Minor	Negligible	Negligible
Brabazon Roundabout (Site Access, Southern Arm)	NB	61%	Moderate	Negligible	Negligible
Concorde Roundabout (Southern Arm, Site Access)	SB	93%	Major	Negligible	Negligible
Concorde Roundabout (Southern Arm, Site Access)	NB	45%	Minor	Negligible	Negligible

- 8.7.10 As shown above, all seven links in the AM peak result in a **minor adverse** significance of effect and all four links in the PM peak result in a **negligible** significance of effect. Therefore, it is considered that the impact of the complete and operational Proposed Development on severance is **not significant**.

Driver Delay

- 8.7.11 For assessing the impact on driver delay, the receptors are the highway links of the surrounding study area. As shown in **Table 8.8**, sensitivity of links is based on their volume to capacity ratio (V/C).

8.7.12 Table 8.19 **Error! Reference source not found.** and Table 8.20 **Error! Reference source not found.** shows the impact on link V/Cs in the AM peak and PM peak, respectively, for the Proposed Development. Percentage change in traffic flows that are not negligible (greater than 30%) are highlighted in orange.

Table 8.19: 2036 Link Driver Delay – AM Peak V/C Ratio and Change in Traffic Flows in the 2036 Baseline and 2036 Baseline with Proposed Development

Location	Direction	V/C Ratio		Receptor Sensitivity	% Change in Traffic
		2036 Baseline	2036 Baseline with Proposed Development		
A38 (Hayes Way / Gloucester Road Gyratory)	NB	52%	52%	Negligible	1%
A38 (North of Proposed Access)	NB	27%	27%	Negligible	1%
A38 (South of Signalised Gyratory)	NB	27%	29%	Negligible	5%
A38 / Hayes Way Signalised Gyratory	NB	35%	36%	Negligible	5%
B4057 (South of Stoke Lane)	WB	29%	34%	Negligible	17%
Blenheim Roundabout (Site Access, Southern Arm)	SB	20%	29%	Negligible	17%
Brabazon Roundabout (Site Access, Southern Arm)	SB	3%	14%	Negligible	157%
Brabazon Roundabout (Site Access, Southern Arm)	NB	13%	33%	Negligible	343%
Concorde Roundabout	WB	30%	32%	Negligible	5%
Concorde Roundabout	EB	3%	29%	Negligible	18%

Location	Direction	V/C Ratio		Receptor Sensitivity	% Change in Traffic
		2036 Baseline	2036 Baseline with Proposed Development		
Concorde Roundabout (Southern Arm, Site Access)	SB	1%	18%	Negligible	1683%
Concorde Roundabout (Southern Arm, Site Access)	NB	20%	24%	Negligible	1045%
Filton Avenue	WB	2%	2%	Negligible	36%
Gloucester Road (South of Junction with Muller Road)	SB	22%	22%	Negligible	0%
Hayes Way (Between Brabazon Roundabout and San Andreas Roundabout)	WB	53%	61%	Negligible	16%
Hayes Way (Between Concorde Roundabout and Blenheim Roundabout)	WB	61%	63%	Negligible	5%
Hayes Way (Between San Andreas Roundabout and Merlin Road)	EB	34%	41%	Negligible	21%
Hayes Way (East of Concorde Roundabout)	NB	5%	5%	Negligible	12%
Hayes Way / A38 Signalised Gyratory	EB	17%	25%	Negligible	47%
Highwood Road	NB	67%	84%	Medium	25%
Highwood Road (Western Arm)	WB	13%	15%	Negligible	11%
Highwood Road Gyratory (Western Arm)	EB	27%	30%	Negligible	12%
Lysander Road	WB	20%	24%	Negligible	22%
Lysander Road	EB	16%	18%	Negligible	12%
Lysander Road (north of Merlin Road Roundabout)	NB	13%	7%	Negligible	20%

Location	Direction	V/C Ratio		Receptor Sensitivity	% Change in Traffic
		2036 Baseline	2036 Baseline with Proposed Development		
Lysander Road (north of Merlin Road Roundabout)	SB	18%	21%	Negligible	0%
Lysander Road (south of Merlin Road Roundabout)	WB	9%	15%	Negligible	60%
Merlin road (to the east of Merlin road / Lysander Road Roundabout)	EB	23%	26%	Negligible	15%
Merlin Road (to the west of San Andreas roundabout)	EB	42%	47%	Negligible	18%
San Andreas Roundabout	EB	59%	69%	Negligible	16%
San Andreas Roundabout (Merlin Road to Highwood Road)	NB	59%	79%	Low	25%
The Laurels	WB	21%	22%	Negligible	5%

Table 8.20: Link Driver Delay – PM Peak V/C Ratio and Change in Traffic Flows in the 2036 Baseline and 2036 Baseline with Proposed Development

Location	Direction	V/C Ratio		Receptor Sensitivity	% Change in Traffic
		2036 Baseline	2036 Baseline with Proposed Development		
A38 (Hayes Way / Gloucester Road Gyratory)	NB	42%	51%	Negligible	12%
A38 (North of Proposed Access)	NB	24%	29%	Negligible	14%
A38 (South of Signalised Gyratory)	NB	25%	33%	Negligible	19%

Location	Direction	V/C Ratio		Receptor Sensitivity	% Change in Traffic
		2036 Baseline	2036 Baseline with Proposed Development		
A38 / Hayes Way Signalised Gyratory	NB	32%	42%	Negligible	19%
B4057 (South of Stoke Lane)	WB	31%	32%	Negligible	8%
Blenheim Roundabout (Site Access, Southern Arm)	SB	13%	42%	Negligible	43%
Brabazon Roundabout (Site Access, Southern Arm)	SB	30%	24%	Negligible	-29%
Brabazon Roundabout (Site Access, Southern Arm)	NB	12%	31%	Negligible	61%
Concorde Roundabout	WB	1%	8%	Negligible	12%
Concorde Roundabout	EB	43%	48%	Negligible	13%
Concorde Roundabout (Southern Arm, Site Access)	SB	1%	1%	Negligible	93%
Concorde Roundabout (Southern Arm, Site Access)	NB	10%	12%	Negligible	45%
Filton Avenue	WB	33%	37%	Negligible	9%
Gloucester Road (South	SB	90%	101%	High	7%

Location	Direction	V/C Ratio		Receptor Sensitivity	% Change in Traffic
		2036 Baseline	2036 Baseline with Proposed Development		
of Junction with Muller Road)					
Hayes Way (Between Brabazon Roundabout and San Andreas Roundabout)	WB	47%	49%	Negligible	10%
Hayes Way (Between Concorde Roundabout and Blenheim Roundabout)	WB	15%	14%	Negligible	12%
Hayes Way (Between San Andreas Roundabout and Merlin Road)	EB	33%	43%	Negligible	3%
Hayes Way (East of Concorde Roundabout)	NB	42%	46%	Negligible	6%
Hayes Way / A38 Signalised Gyratory	EB	25%	26%	Negligible	24%
Highwood Road	NB	52%	55%	Negligible	9%
Highwood Road (Western Arm)	WB	64%	68%	Negligible	4%

Location	Direction	V/C Ratio		Receptor Sensitivity	% Change in Traffic
		2036 Baseline	2036 Baseline with Proposed Development		
Highwood Road Gyratory (Western Arm)	EB	37%	38%	Negligible	5%
Lysander Road	WB	31%	35%	Negligible	4%
Lysander Road	EB	27%	27%	Negligible	4%
Lysander Road (north of Merlin Road Roundabout)	NB	41%	42%	Negligible	10%
Lysander Road (north of Merlin Road Roundabout)	SB	50%	50%	Negligible	-2%
Lysander Road (south of Merlin Road Roundabout)	WB	101%	100%	High	3%
Merlin road (to the east of Merlin road / Lysander Road Roundabout)	EB	37%	41%	Negligible	1%
Merlin Road (to the west of San Andreas roundabout)	EB	48%	52%	Negligible	1%
San Andreas Roundabout	EB	20%	29%	Negligible	10%
San Andreas Roundabout (Merlin Road to Highwood Road)	NB	42%	51%	Negligible	5%

Location	Direction	V/C Ratio		Receptor Sensitivity	% Change in Traffic
		2036 Baseline	2036 Baseline with Proposed Development		
The Laurels	WB	24%	29%	Negligible	28%

8.7.13 The tables **Error! Reference source not found.** show that in the peak hours, most of the links assessed would bring about a negligible change in vehicle movements (less than 30%) as a result of the Proposed Development. Driver delay is subject to the same thresholds as severance with less than a 30% change in vehicle flows resulting in a negligible magnitude of impact on driver delay.

8.7.14 For the seven links in the AM peak and four links in the PM peak where the percentage change in traffic flow is greater than 30%, the receptor sensitivity, magnitude of impact and resulting significance of effect are listed in Table 8.21 **Error! Reference source not found.** for the AM peak and Table 8.22 **Error! Reference source not found.** for the PM peak.

Table 8.21: Links in the AM Peak with an Increase in Vehicle Movements of more than 30%

Link	Direction	% Change	Receptor Sensitivity	Magnitude of Impact	Significance of Effect
Brabazon Roundabout (Site Access, Southern Arm)	SB	157%	Negligible	Substantial	Minor Adverse
Brabazon Roundabout (Site Access, Southern Arm)	NB	343%	Negligible	Substantial	Minor Adverse
Concorde Roundabout (Southern Arm, Site Access)	SB	1683%	Negligible	Substantial	Minor Adverse
Concorde Roundabout (Southern Arm, Site Access)	NB	1045%	Negligible	Substantial	Minor Adverse
Filton Avenue	WB	36%	Negligible	Minor	Negligible
Hayes Way / A38 Signalised Gyratory	EB	47%	Negligible	Minor	Negligible
Lysander Road (south of Merlin Road Roundabout)	WB	60%	Negligible	Moderate	Negligible

Table 8.22: Links in the PM Peak with an Increase in Vehicle Movements of more than 30%

Link	Direction	% Change	Receptor Sensitivity	Magnitude of Impact	Significance of Effect
Blenheim Roundabout (Site Access, Southern Arm)	SB	43%	Negligible	Minor	Negligible
Brabazon Roundabout (Site Access, Southern Arm)	NB	61%	Negligible	Moderate	Negligible
Concorde Roundabout (Southern Arm, Site Access)	SB	93%	Negligible	Major	Negligible
Concorde Roundabout (Southern Arm, Site Access)	NB	45%	Negligible	Minor	Negligible

- 8.7.15 As shown above, four links in the AM peak result in a **minor adverse** significance of effect with the remaining three links resulting in a **negligible** significance of effect, and all four links in the PM peak result in a **negligible** significance of effect. Therefore, it is considered that the impact of the complete and operational Proposed Development on driver delay is **not significant**.

Pedestrian and Cyclist Delay

- 8.7.16 For assessing the impact on pedestrian and cyclist delay, the receptors are pedestrians and cyclists that are living in or visiting the study area and thus using the links within the study area. As shown in **Table 8.8**, sensitivity of pedestrians and cyclists are based on the level of infrastructure provided on the surrounding highway network. The highway links that are assessed have segregated pavements and designated pedestrian crossing within a reasonable walking distance, with marked cycle lanes at some links. Therefore, the highway links assessed are considered to have an overall average quality pedestrian and cycle infrastructure. As a result, pedestrians and cyclists would have a medium sensitivity.
- 8.7.17 As shown in Error! Reference source not found.**Table 8.12** and **Table 8.13**Error! Reference source not found., the Proposed Development would bring about some increases in the number of vehicles movements in the AM Peak and PM Peak, which would have the potential to increase the delay of pedestrians and cyclists seeking to cross roads. However, given the 15m wide pedestrian boulevard proposed as part of this application, the segregation of cycle lanes throughout the Site and the increased pedestrian permeability resulting from the expansion of Brabazon Park, the improvements in pedestrian and cyclist infrastructure would result in a moderate beneficial effect.
- 8.7.18 Therefore, given the medium sensitivity of the receptors, it is considered that the effect of the complete and operational Proposed Development on pedestrian and cyclist delay is **moderate beneficial (significant)**.

Pedestrian and Cyclist Amenity

- 8.7.19 For assessing the impact on pedestrian and cyclist amenity, the receptors are pedestrians and cyclists that are living in or visiting the study area and thus using the links in the study area. As outlined above in **Paragraph 8.7.16**, pedestrians and cyclists would have a medium sensitivity.
- 8.7.20 As shown in Error! Reference source not found.**Table 8.12** and **Table 8.13**Error! Reference source not found., the Proposed Development would

bring about some increases in the number of vehicles movements in the AM Peak and PM Peak, which would have the potential to impact pedestrian and cyclist amenity. However, given the 15m wide pedestrian boulevard proposed as part of this application, the segregation of cycle lanes throughout the Site and the increased pedestrian permeability resulting from the expansion of Brabazon Park, the improvements in pedestrian and cyclist infrastructure would result in a moderate beneficial effect.

- 8.7.21 Therefore, given the medium sensitivity of the receptors, it is considered that the effect of the complete and operational Proposed Development on pedestrian and cyclist amenity is **moderate beneficial (significant)**.

Fear and Intimidation

- 8.7.22 For assessing the impact on fear and intimidation, the receptors are pedestrians and cyclists that are living in or visiting the study area and thus using the links in the study area. As outlined in **Paragraph 8.7.16**, pedestrians and cyclists would have a medium sensitivity.

- 8.7.23 Error! Reference source not found. **Table 8.23** shows the change in average hourly vehicle flows over an 18-hour period from the 2036 Baseline to the 2036 Baseline with Proposed Development.

Table 8.23: 2036 Baseline vs. 2036 Baseline with Proposed Development – Average Hourly (based on 18-hour AAWT) Traffic Flows

Location	Direction	2036 Baseline 18hr Avg Flow	2036 Baseline with Proposed Development 18hr Avg Traffic Flows	Change in Flow
A38 (Hayes Way / Gloucester Road Gyratory)	NB	503	538	35
A38 (North of Proposed Access)	NB	1013	1100	87
A38 (South of Signalised Gyratory)	NB	675	768	92
A38 / Hayes Way Signalised Gyratory	NB	675	768	92
B4057 (South of Stoke Lane)	WB	144	162	18
Blenheim Roundabout (Site Access, Southern Arm)	SB	164	232	67
Brabazon Roundabout (Site Access, Southern Arm)	SB	112	143	30
Brabazon Roundabout (Site Access, Southern Arm)	NB	88	225	137

Location	Direction	2036 Baseline 18hr Avg Flow	2036 Baseline with Proposed Development 18hr Avg Traffic Flows	Change in Flow
Concorde Roundabout	WB	998	1101	103
Concorde Roundabout	EB	930	1086	156
Concorde Roundabout (Southern Arm, Site Access)	SB	10	166	156
Concorde Roundabout (Southern Arm, Site Access)	NB	29	79	50
Filton Avenue	WB	17	21	4
Gloucester Road (South of Junction with Muller Road)	SB	280	287	7
Hayes Way (Between Brabazon Roundabout and San Andreas Roundabout)	WB	826	941	116
Hayes Way (Between Concorde Roundabout and Blenheim Roundabout)	WB	998	1101	103
Hayes Way (Between San Andreas Roundabout and Merlin Road)	EB	699	771	72
Hayes Way (East of Concorde Roundabout)	NB	65	70	5
Hayes Way / A38 Signalised Gyratory	EB	373	513	140
Highwood Road	NB	652	772	120
Highwood Road (Western Arm)	WB	303	323	20
Highwood Road Gyratory (Western Arm)	EB	285	305	20
Lysander Road	WB	510	552	42

Location	Direction	2036 Baseline 18hr Avg Flow	2036 Baseline with Proposed Development 18hr Avg Traffic Flows	Change in Flow
Lysander Road	EB	680	724	44
Lysander Road (north of Merlin Road Roundabout)	NB	197	191	-5
Lysander Road (north of Merlin Road Roundabout)	SB	359	384	25
Lysander Road (south of Merlin Road Roundabout)	WB	344	390	46
Merlin road (to the east of Merlin road / Lysander Road Roundabout)	EB	997	1048	50
Merlin Road (to the west of San Andreas roundabout)	EB	805	862	57
San Andreas Roundabout	EB	826	941	116
San Andreas Roundabout (Merlin Road to Highwood Road)	NB	754	855	101
The Laurels	WB	150	182	32

8.7.24 As shown in **Table 8.23****Error! Reference source not found.**, the Proposed Development would not generate a change in hourly flow of more than 600 vehicles, resulting in a negligible magnitude of impact. Given the moderate sensitivity of the receptors, all links will result in a **negligible** significance of effect and therefore it is considered that the impact of the complete and operational Proposed Development on fear and intimidation is not significant.

Accidents and Safety

8.7.25 As outlined in **Paragraph 8.5.23 to 8.5.26**, in the Site vicinity, the majority of accidents have taken place on and around the following junctions:

- Cribbs Causeway interchange to the north-west of the Site
- Merlin Road / Lysander Road to the north of the Site
- Filton Roundabout on the A38 to the south-east of the Site

- 8.7.26 No links on and within 25m of the approach of the Cribbs Causeway interchange experience a 10% or greater increase in traffic and therefore these links receive a negligible impact on receptors of varying sensitivities.
- 8.7.27 No links on and within 25m of the approach of Filton Roundabout experience a 10% or greater increase in traffic and therefore these links receive a negligible impact on receptors of varying sensitivity.
- 8.7.28 Some links on and within 25m of the approach of the junction of Merlin Road and Lysander Road experience a 10% or greater increase in traffic. Further to the quantitative analysis of traffic flows, a qualitative analysis of the relevant collision descriptions indicate that the accidents at the junction were caused by vehicle approaching the roundabout. Therefore, the increase in traffic levels at the links approaching the junction are summarised below in Table 8.24 **Error! Reference source not found.**

Table 8.24 Summary of Change in Traffic Flow at Assessed Links on the Lysander Road and Merlin Road Junction

Location	Direction	AM Peak		PM Peak	
		% Change in Traffic	Magnitude of Impact	% Change in Traffic	Magnitude of Impact
Lysander Road	EB	12%	Negligible	4%	Negligible
Lysander Road (north of Merlin Road Roundabout)	SB	20%	Minor	-2%	Negligible
Merlin Road (east of Merlin Road / Lysander Road Roundabout)	EB	15%	Minor	1%	Negligible

- 8.7.29 The percentage change in traffic at the Lysander Road eastbound link results in a negligible magnitude of impact in both the AM peak and PM peak. As Lysander Road has a segregated pavement but no cycle lane, and all accidents were categorised as slight accidents, the receptor sensitivity is identified as low. Therefore, the significance of effect would be negligible.
- 8.7.30 The percentage change in traffic at the Lysander Road (north of Merlin Road Roundabout) southbound link results in a minor magnitude of impact in the AM peak and a negligible magnitude of impact in the PM peak. As this section of the highway has a segregated pavement but no cycle lane, and all accidents were categorised as slight accidents and involved vehicles only, the receptor sensitivity is identified as low. Therefore, the significance of effect would be **minor adverse** in the AM peak and negligible in the PM peak.
- 8.7.31 The percentage change in traffic at the Merlin Road (east of Merlin Road / Lysander Road Roundabout) eastbound link results in a minor magnitude of impact in the AM peak and a negligible magnitude of impact in the PM peak. As this section of the highway has a segregated pavement but no cycle lane, and all accidents were categorised as slight accidents, and involved vehicles only, the receptor sensitivity is identified as low. Therefore, the significance of effect would be **minor adverse** in the AM peak and negligible in the PM peak.

- 8.7.32 Based on the above, it is considered that the impact of the complete and operational Proposed Development on accidents and safety is **not significant** as the significance of effect across the highway links ranges from negligible to minor adverse.

Public Transport Capacity

- 8.7.33 For assessing the impact on public transport capacity, the receptors are the public transport services that run through the Site. This includes the metrobus which operates along Runway Avenue, the rail which operates via the new North Filton railway station, and the proposed mass rapid transit (MRT) route (Transport Phase 4 only). As shown in Table 8.8, the sensitivity of public transport networks is based on the level of spare capacity after development trips and background demand have been taken into account. The level of spare capacity for each assessed period is shown in the tables below.
- 8.7.34 **Table 8.14**Error! Reference source not found., **Table 8.15** Error! Reference source not found.and
- 8.7.35
- 8.7.36 **Table 8.16**Error! Reference source not found. above show the background public transport demand and the forecasted development public transport trips in the AM peak hour, PM peak hour and PM peak hour with YTL Arena trips, across the four Transport Phases, respectively.

Bus

8.7.37 **Table 8.25** shows the proportion of bus trips that will occupy the available capacity and the resulting proportion of spare capacity, during the AM peak hour across the Transport Phases.

Table 8.25 Occupancy Impact on the Metrobus Network During the AM Peak Hour (08:00 – 09:00)

	Transport Phase 1		Transport Phase 2		Transport Phase 3		Transport Phase 4	
	EB	WB	EB	WB	EB	WB	EB	WB
Total Capacity	420		560		560		2560	
Background Demand	49	41	66	55	66	55	66	55
Development Trips	178	134	332	256	434	334	275	230
Occupancy Impact	48%	35%	67%	51%	88%	66%	11%	9%
Spare Capacity	46%	58%	29%	44%	11%	31%	87%	89%

8.7.38 **Table 8.26** shows the proportion of bus trips that will occupy the available capacity and the resulting proportion of spare capacity, during the PM peak hour, taking into account trips to the YTL Arena as per that consented application, across the Transport Phases.

Table 8.26 Occupancy Impact on the Metrobus Network During the PM Peak Hour (17:00 – 18:00)

	Transport Phase 1		Transport Phase 2		Transport Phase 3		Transport Phase 4	
	EB	WB	EB	WB	EB	WB	EB	WB
Total Capacity	420		560		560		2560	
Background Demand	39	48	52	64	52	64	52	64
Development Trips	123	210	207	368	267	471	206	253
Occupancy Impact	32%	56%	41%	74%	53%	95%	8%	10%
Spare Capacity	61%	39%	54%	23%	43%	4%	90%	88%

8.7.39 **Table 8.27** shows the proportion of bus trips that will occupy the available capacity during the PM peak hour, taking into account trips to the YTL Arena as per that consented application, as part of the development trips, across the Transport Phases.

Table 8.27: Occupancy Impact on the Metrobus Network During the PM Peak with Arena trips (17:00 – 18:00)

	Transport Phase 1		Transport Phase 2		Transport Phase 3		Transport Phase 4	
	EB	WB	EB	WB	EB	WB	EB	WB
Total Capacity	420		560		560		2560	
Background Demand	39	48	52	64	52	64	52	64
Development Plus Arena Trips	163	260	247	417	330	548	233	286
Occupancy Impact	43%	70%	49%	84%	65%	110%	9%	11%
Spare Capacity	52%	27%	47%	14%	32%	-9%	89%	86%

8.7.40 Based on the above, **Table 8.28** summarises the resulting significance of effect at each Transport Phase in the AM peak, PM peak and PM peak with Arena for the bus network.

8.7.41 Across all scenarios and Transport Phases, the magnitude of impact ranges from minor to substantial. In most cases, the receptor sensitivity is negligible and therefore the resulting significance of effect is **minor adverse and not significant**.

8.7.42 As indicated in **Table 8.28**, the occupancy impact and level of spare capacity at Transport Phase 3 results in a **moderate adverse** significance of effect in the eastbound direction in the AM Peak and **substantial adverse** significance of effect in the westbound direction in the PM Peak with and without Arena trips.

8.7.43 However, as the level of bus provision in Transport Phase 3 is not yet fully determined, there is a likelihood of a higher capacity being provided which would lower the sensitivity of the receptor. The proposed public transport capacity from Transport Phase 2 onwards is intended to accommodate the anticipated demand from the Proposed Development only, hence the high impact on occupancy. In other words, the new bus services are expected to accommodate this demand, rather than responding to existing demand. As detailed in Section 8.5 of the Planning Statement, the public transport capacity, based on demand, would be reassessed closer to the time.

8.7.44 Further, the occupancy impact and level of spare capacity at Transport Phase 2 in the PM peak with Arena results in **moderate adverse** impact. However, given the rarity of this scenario occurring (full capacity events to occur no more than 26 times a year), the sensitivity of the receptor in this scenario is considered to be negligible and the impact is considered to be **not significant**.

Table 8.28: Summary of Significance of Effect for Bus Trips

	AM Peak (08:00 – 09:00)				PM Peak (17:00 – 18:00)				PM Peak with Arena (17:00 – 18:00)			
	TP 1	TP 2	TP 3	TP 4	TP 1	TP 2	TP 3	TP 4	TP 1	TP 2	TP 3	TP 4
Sensitivity of Receptors (Eastbound)	N	N	Low	N	N	N	N	N	N	N	N	N
Magnitude of Impact (Eastbound)	Sub	Sub	Sub	Mod	Sub	Sub	Sub	Min	Sub	Sub	Sub	Min
Significance of Effect (Eastbound)	Minor Adverse	Minor Adverse	Moderate Adverse	N	Minor Adverse	Minor Adverse	Minor Adverse	N	Minor Adverse	Minor Adverse	Minor Adverse	N
Sensitivity of Receptors (Westbound)	N	N	N	N	N	N	H	N	N	L	H	N
Magnitude of Impact (Westbound)	Sub	Sub	Sub	Min	Sub	Sub	Sub	Mod	Sub	Sub	Sub	Mod
Significance of Effect (Westbound)	Minor Adverse	Minor Adverse	Minor Adverse	N	Minor Adverse	Minor Adverse	Substantial Adverse	N	Minor Adverse	Moderate Adverse	Substantial Adverse	N

Notes:

TP = Transport Phase

N = Negligible, **L** = Low, **M** = Medium, **H** = High

N = Negligible, **Min** = Minor, **Mod** = Moderate, **Maj** = Major, **Sub** = Substantial

Mass Rapid Transit (MRT)

8.7.45 **Table 8.29** shows the proportion of MRT trips that will occupy the available capacity and the resulting proportion of spare capacity, during the AM peak hour across the Transport Phases.

Table 8.29: Occupancy Impact on the MRT Network in Transport Phase 4

	AM Peak (08:00 – 09:00)		PM Peak (17:00 – 18:00)		PM Peak with Arena (17:00 – 18:00)	
	EB	WB	EB	WB	EB	WB
Total Capacity	2000		2000		2000	
Background Demand	241	164	130	260	130	260
Development Trips	980	820	733	902	830	1022
Occupancy Impact	1221	984	863	1162	960	1282
Spare Capacity	56%	45%	39%	52%	44%	59%

8.7.46 Based on the above, Table 8.30 summarises the resulting significance of effect at each Transport Phase in the AM peak, PM peak and PM peak with Arena for the MRT network.

Table 8.30: Summary of Significance of Effect for MRT Trips

	AM Peak (08:00 – 09:00)	PM Peak (17:00 – 18:00)	PM Peak with Arena (17:00 – 18:00)
Sensitivity of Receptors (Eastbound)	N	N	N
Magnitude of Impact (Eastbound)	Sub	Maj	Maj
Significance of Effect (Eastbound)	Minor Adverse	Negligible	Negligible
Sensitivity of Receptors (Westbound)	N	N	N
Magnitude of Impact (Westbound)	Maj	Sub	Maj

Significance of Effect (Westbound)	Negligible	Negligible	Negligible
Notes: N = Negligible, L = Low, M = Medium, H = High N = Negligible, Min = Minor, Mod = Moderate, Maj = Major, Sub = Substantial			

8.7.47 Across all scenarios, the magnitude of impact ranges from major to substantial with a negligible sensitivity of receptor in all scenarios. Therefore, the significance of effect is minor adverse in the AM Peak westbound direction and negligible in all remaining scenarios, which is **not significant**.

Rail

8.7.48 **Table 8.31** shows the proportion of rail trips that will occupy the available capacity during the AM peak hour across the Transport Phases.

Table 8.31: Occupancy Impact on the Rail Network During the AM Peak (08:00 – 09:00)

	Transport Phase 1		Transport Phase 2		Transport Phase 3		Transport Phase 4	
	EB	WB	EB	WB	EB	WB	EB	WB
Total Capacity	353		1746		2910		2910	
Background Demand	52	34	156	102	260	170	260	170
Development Trips	121	184	304	655	776	986	768	1522
Occupancy Impact	40%	58%	19%	40%	29%	36%	29%	56%
Spare Capacity	51%	38%	74%	57%	64%	60%	65%	42%

8.7.49 Table 8.32 shows the proportion of rail trips that will occupy the available capacity during the AM peak hour across the Transport Phases.

Table 8.32: Occupancy Impact on the Rail Network During the PM Peak (17:00 – 18:00)

	Transport Phase 1		Transport Phase 2		Transport Phase 3		Transport Phase 4	
	EB	WB	EB	WB	EB	WB	EB	WB
Total Capacity	353		1746		2910		2910	

	Transport Phase 1		Transport Phase 2		Transport Phase 3		Transport Phase 4	
	EB	WB	EB	WB	EB	WB	EB	WB
Background Demand	26	57	78	171	130	285	130	285
Development Trips	129	72	594	223	998	627	1383	636
Occupancy Impact	39%	24%	36%	14%	36%	24%	50%	24%
Spare Capacity	56%	63%	62%	77%	61%	69%	48%	68%

8.7.50 **Table 8.33** shows the proportion of rail trips that will occupy the available capacity during the PM peak hour, taking into account trips to the YTL Arena as per that consented application, as part of the development trips, across the Transport Phases.

Table 8.33: Occupancy Impact on the Rail Network During the PM Peak with Arena trips (17:00 – 18:00)

	Transport Phase 1		Transport Phase 2		Transport Phase 3		Transport Phase 4	
	EB	WB	EB	WB	EB	WB	EB	WB
Total Capacity	353		1746		2910		2910	
Background Demand	26	57	78	171	130	285	130	285
Development Plus Arena Trips	246	189	711	340	1115	972	1500	981
Occupancy Impact	75%	64%	43%	22%	40%	37%	54%	37%
Spare Capacity	23%	30%	55%	71%	57%	57%	44%	56%

8.7.51 Based on the above, Table 8.34 summarises the resulting magnitude of impact at each Transport Phase in the AM peak, PM peak and PM peak with YTL Arena for the rail network.

8.7.52 The magnitude of impact ranges from major to substantial across the scenarios and Transport Phases. In most cases, the receptor sensitivity is negligible and therefore the resulting significance of effect is **negligible or minor adverse and not significant**.

Table 8.34: Summary of Significance of Effect for Rail Trips

	AM Peak (08:00 – 09:00)				PM Peak (17:00 – 18:00)				PM Peak with Arena (17:00 – 18:00)			
	TP 1	TP 2	TP 3	TP 4	TP 1	TP 2	TP 3	TP 4	TP 1	TP 2	TP 3	TP 4
Sensitivity of Receptors (Eastbound)	N	N	N	N	N	N	N	N	N	N	N	N
Magnitude of Impact (Eastbound)	Sub	Maj	Sub	Sub	Sub	Sub	Sub	Sub	Sub	Sub	Sub	Sub
Significance of Effect (Eastbound)	Minor Adverse	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse
Sensitivity of Receptors (Westbound)	N	N	N	N	N	N	N	N	N	N	N	N
Magnitude of Impact (Westbound)	Sub	Sub	Sub	Sub	Sub	Mod	Sub	Sub	Sub	Sub	Sub	Sub
Significance of Effect (Westbound)	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse

Notes:

TP = Transport Phase

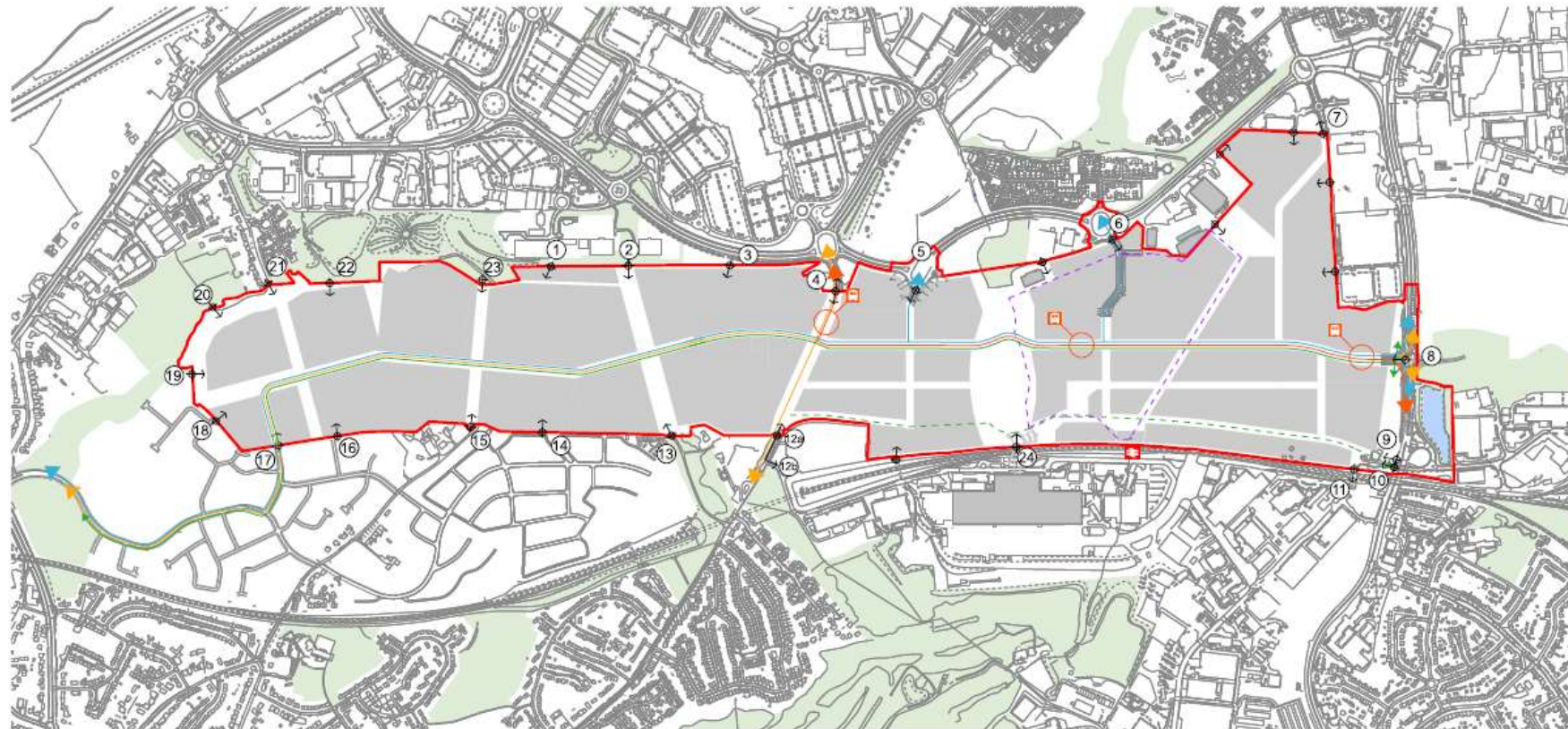
N = Negligible, **L** = Low, **M** = Medium, **H** = High

N = Negligible, **Min** = Minor, **Mod** = Moderate, **Maj** = Major, **Sub** = Substantial

Public Access

- 8.7.53 For assessing the impact on Public Access, the receptors are pedestrians, cyclists and vehicles within the study area and accessing the Site. As shown in **Table 8.8**, sensitivity of pedestrians, cyclists and vehicles are based on the level of infrastructure provided on the surrounding highway network. Public access points for pedestrians are provided through the existing PRow, and for cyclists and vehicles are provided via the Combination Junction, which connects to the marked cycle lane on the A38. Therefore, these existing public accesses are considered to have an overall average quality of infrastructure. As a result, the receptor sensitivity is considered to be of medium sensitivity.
- 8.7.54 As shown in the Access Parameter Plan shown in **Inset Figure 8.6**, a number of public accesses and routes are delivered as part of the Proposed Development. The main public access points are to the north of the Site, connecting pedestrians, cyclists and vehicles to Hayes Way, Cribbs Causeway and the surrounding highway network. Further public accesses are provided to the east, west and south of the Site, connecting to surrounding developments such as Henbury Trym and Fishpool Hill.
- 8.7.55 The pedestrian accesses would also enhance the overall connectivity of the existing PRow. It should be noted that the existing PRow around the Site will be retained and potentially diverted to follow the proposed route taken by pedestrians into the Site.
- 8.7.56 Given the increased overall accessibility of the Site and the range of public accesses from different directions for pedestrians, cyclists and vehicles, the proposed development would result in a major beneficial effect on public access.
- 8.7.57 Therefore, given the medium sensitivity of the receptors, it is considered that the effect of the complete and operational Proposed Development on public access is **major beneficial (significant)**.

Inset Figure 8.6 Access Parameter Plan (Source: YTL Developments and Feilden Cleff Bradley Studios)



- ① Ped and cycle connection to Baylis development. Potential localised vehicle access to adjacent plots only
- ② Ped and cycle connection to new connection to Crittys Causeway
- ③ Ped connection to existing Public Right of Way. Potential localised vehicle access to adjacent plots only
- ④ Bus, Incl MetroBus, ped and cycle connection to San Andreas roundabout. Controlled access to Arena for authorised vehicles only.
- ⑤ All modes connections to Brabazon roundabout
- ⑥ All modes connection to Blenheim roundabout
- ⑦ All modes connection to Concorde roundabout (vehicular access to Enterprise Road North)
- ⑧ All modes Incl. MetroBus Junction with A38
- ⑨ At grade cycle connection with A38
- ⑩ All mode connection to Combledon Junction (vehicular access only to Station Street and Enterprise Road South)
- ⑪ Controlled vehicular access to Airbus Campus
- ⑫ Bus, ped and cycle only connection to Charlton Road. No vehicular access or egress to and from Charlton Road except buses
- ⑬ Controlled access to Arena for authorised vehicles only.

- ⑭ Ped and cycle connection to Charlton Common
- ⑮ Ped and cycle connection to Fishpool Hill development site
- ⑯ Ped and cycle connection to Fishpool Hill
- ⑰ Ped and cycle connection to Fishpool Hill development site
- ⑱ All modes connection to Fishpool Hill development site
- ⑲ Ped and cycle connection to Fishpool Hill development site
- ⑳ Ped and cycle connection to Henbury Trym corridor
- ㉑ Ped and cycle connection to Henbury Trym corridor
- ㉒ Ped and cycle connection to Catrain Hill
- ㉓ Ped connection to existing Public Right of Way
- ㉔ Ped connection to existing Public Right of Way
- ㉕ Potential connection

- ㉖ Pedestrian Bridge to Bristol Arena

Legend

- Primary Road network →
- MetroBus network →
- MetroBus stop (M)
- Local Bus Route (7.3m). Additional routes to be agreed with SGC →
- Cycle Trunk Route →
- Secondary East West Cycle Route →
- Railway Station (R)
- Proposed Heritage Walk (flexible alignment) - - -

8.8 Assessment of Likely Effects – Sensitivity Analysis (Proposed Development without Combination Junction and Concorde Roundabout)

Demolition and Construction

8.8.1 As set out in **Section 8.4**, the assessment of construction effects is scoped out of this chapter.

Operational Development

8.8.2 A sensitivity analysis for a scenario in which Combination Junction and Concorde Roundabout do not come forward as access points to the Site has been carried out. This follows the same methodology as Section 8.7 but using GBATS4 traffic flow data resulting from these access points not being used for the 2036 Baseline with Proposed Development scenario. Public transport and public access are not included in this section as the results are the same as the main Proposed Development assessment as per Section 8.7.

8.8.3 For public access, the only difference would be that there would be no vehicular access from Combination Junction and Concorde Roundabout but this is not considered to have a notable impact on the assessment.

8.8.4 For all the effects assessed, the impact would be direct and long-term. The effects on severance, amenity, delay fear and intimidation and accidents and safety would be local whilst the impact on public transport capacity would be district-wide.

8.8.5 The impact of additional vehicle movements on the study area as a result of the Proposed Development without Combination Junction and Concorde Roundabout is summarised below in Table 8.35 **Error! Reference source not found.** and Table 8.36 **Error! Reference source not found.** for the AM peak and PM peak, respectively. Percentage change in traffic flows that are not negligible (greater than 30%) are highlighted in orange.

Table 8.35 2036 Baseline vs. 2036 Baseline with Proposed Development (without Concorde Roundabout and Combination Junction) – AM Peak Traffic Flows

Link	Direction	AM Peak (08:00 – 09:00)			
		2036 Baseline	2036 Baseline with Proposed Development (without Concorde Roundabout and Combination Junction)	Vehicle Increase	% Change*
A38 (Hayes Way / Gloucester Road Gyratory)	NB	774	789	15	2%
A38 (North of Proposed Access)	NB	1504	1630	126	8%

Link	Direction	AM Peak (08:00 – 09:00)			
		2036 Baseline	2036 Baseline with Proposed Development (without Concorde Roundabout and Combination Junction)	Vehicle Increase	% Change*
A38 (South of Signalised Gyratory)	NB	983	1147	164	17%
A38 / Hayes Way Signalised Gyratory	NB	983	1147	164	17%
B4057 (South of Stoke Lane)	WB	190	213	23	12%
Blenheim Roundabout (Site Access, Southern Arm)	SB	271	681	410	151%
Brabazon Roundabout (Site Access, Southern Arm)	SB	42	171	128	303%
Brabazon Roundabout (Site Access, Southern Arm)	NB	125	327	201	161%
Concorde Roundabout	WB	1135	1507	372	33%
Concorde Roundabout	EB	1083	1417	334	31%
Filton Avenue	WB	28	35	7	26%
Gloucester Road (South of Junction with Muller Road)	SB	526	529	3	1%

Link	Direction	AM Peak (08:00 – 09:00)			
		2036 Baseline	2036 Baseline with Proposed Development (without Concorde Roundabout and Combination Junction)	Vehicle Increase	% Change*
Hayes Way (Between Brabazon Roundabout and San Andreas Roundabout)	WB	1422	1696	274	19%
Hayes Way (Between Concorde Roundabout and Blenheim Roundabout)	WB	1135	1507	372	33%
Hayes Way (Between San Andreas Roundabout and Merlin Road)	EB	815	1018	202	25%
Hayes Way (East of Concorde Roundabout)	NB	42	46	4	9%
Hayes Way / A38 Signalised Gyratory	EB	356	653	297	83%
Highwood Road	NB	1060	1355	295	28%
Highwood Road (Western Arm)	WB	293	323	29	10%
Highwood Road Gyratory (Western Arm)	EB	271	300	29	11%

Link	Direction	AM Peak (08:00 – 09:00)			
		2036 Baseline	2036 Baseline with Proposed Development (without Concorde Roundabout and Combination Junction)	Vehicle Increase	% Change*
Lysander Road	WB	302	367	65	21%
Lysander Road	EB	577	643	66	11%
Lysander Road (north of Merlin Road Roundabout)	NB	165	104	0	0%
Lysander Road (north of Merlin Road Roundabout)	SB	414	485	71	17%
Lysander Road (south of Merlin Road Roundabout)	WB	175	279	104	60%
Merlin road (to the east of Merlin road / Lysander Road Roundabout)	EB	878	1003	125	14%
Merlin Road (to the west of San Andreas roundabout)	EB	781	922	141	18%
San Andreas Roundabout	EB	1422	1696	274	19%
San Andreas Roundabout (Merlin Road	NB	876	1129	253	29%

Link	Direction	AM Peak (08:00 – 09:00)			
		2036 Baseline	2036 Baseline with Proposed Development (without Concorde Roundabout and Combination Junction)	Vehicle Increase	% Change*
to Highwood Road)					
The Laurels	WB	214	240	26	12%

*The analysis has rounded % change to the nearest whole number

Table 8.36: 2036 Baseline vs. 2036 Baseline with Proposed Development (without Concorde Roundabout and Combination Junction) – PM Peak Traffic Flows

Link	Direction	PM Peak (08:00 – 09:00)			
		2036 Baseline	2036 Baseline with Proposed Development (without Combination Junction and Concorde Roundabout)	Vehicle Increase	% Change*
A38 (Hayes Way / Gloucester Road Gyratory)	NB	629	766	137	18%
A38 (North of Proposed Access)	NB	1321	1645	324	20%
A38 (South of Signalised Gyratory)	NB	899	1205	306	25%
A38 / Hayes Way Signalised Gyratory	NB	899	1205	306	25%
B4057 (South of Stoke Lane)	WB	212	222	10	5%
Blenheim Roundabout (Site Access, Southern Arm)	SB	187	406	219	54%

Link	Direction	PM Peak (08:00 – 09:00)			
		2036 Baseline	2036 Baseline with Proposed Development (without Combination Junction and Concorde Roundabout)	Vehicle Increase	% Change*
Brabazon Roundabout (Site Access, Southern Arm)	SB	271	232	-39	-17%
Brabazon Roundabout (Site Access, Southern Arm)	NB	120	314	194	62%
Concorde Roundabout	WB	1647	1858	211	11%
Concorde Roundabout	EB	1512	1718	207	12%
Filton Avenue	WB	19	21	2	9%
Gloucester Road (South of Junction with Muller Road)	SB	256	285	28	10%
Hayes Way (Between Brabazon Roundabout and San Andreas Roundabout)	WB	879	989	109	11%
Hayes Way (Between Concorde Roundabout and Blenheim Roundabout)	WB	1647	1858	211	11%
Hayes Way (Between San Andreas Roundabout and Merlin Road)	EB	1133	1167	34	3%
Hayes Way (East of Concorde Roundabout)	NB	138	129	-8	-7%
Hayes Way / A38 Signalised Gyratory	EB	685	890	205	23%
Highwood Road	NB	757	838	81	10%

Link	Direction	PM Peak (08:00 – 09:00)			
		2036 Baseline	2036 Baseline with Proposed Development (without Combination Junction and Concorde Roundabout)	Vehicle Increase	% Change*
Highwood Road (Western Arm)	WB	551	578	27	5%
Highwood Road Gyratory (Western Arm)	EB	524	551	27	5%
Lysander Road	WB	1119	1171	52	4%
Lysander Road	EB	1320	1377	57	4%
Lysander Road (north of Merlin Road Roundabout)	NB	384	432	48	11%
Lysander Road (north of Merlin Road Roundabout)	SB	587	577	-9	-2%
Lysander Road (south of Merlin Road Roundabout)	WB	784	804	20	2%
Merlin road (to the east of Merlin road / Lysander Road Roundabout)	EB	1903	1915	12	1%
Merlin Road (to the west of San Andreas roundabout)	EB	1464	1466	2	0%
San Andreas Roundabout	EB	879	989	109	11%
San Andreas Roundabout (Merlin Road to Highwood Road)	NB	1228	1289	61	5%
The Laurels	WB	204	289	85	29%

Severance

- 8.8.6 For assessing the impact on severance, the receptor would be pedestrians that are living in or visiting the study area. As shown in Table 8.8, the sensitivity of pedestrians is based on the level of infrastructure provided at the respective links. The new highway links that will be constructed as part of the Proposed Development have segregated footways and designated pedestrian crossings within a reasonable walking distance and on desire lines. Desire lines describe the path which represents the shortest or most easily navigated route between an origin and destination.
- 8.8.7 This new pedestrian infrastructure is therefore considered to be of very high quality and as a result, there would be a negligible sensitivity of severance. The sensitivity of pedestrians at links on existing highways is determined on a case-by-case basis below for links where there is a notable magnitude of impact.
- 8.8.8 In a scenario without Concorde Roundabout and Combination Junction, Table 8.35 **Error! Reference source not found.** and Table 8.36 **Error! Reference source not found.** show that in the peak hours, most of the links assessed would bring about a negligible increase in vehicle movements (less than 30%) as a result of the Proposed Development, which represents a negligible magnitude of change. For the eight links in the AM peak and two links in the PM peak where there the increase in vehicle movements is more than 30%, the potential magnitude of change will range from **minor to substantial**. These links and their resulting significance of effect are listed in **Table 8.37** **Error! Reference source not found.** for the AM peak and Table 8.38 **Error! Reference source not found.** for the PM peak.

Table 8.37: Links in the AM Peak with an Increase in Vehicle Movements of more than 30%

Link	Direction	% Change	Magnitude of Impact	Receptor Sensitivity	Significance of Effect
Blenheim Roundabout (Site Access, Southern Arm)	SB	151%	Substantial	Negligible	Minor Adverse
Brabazon Roundabout (Site Access, Southern Arm)	SB	303%	Substantial	Negligible	Minor Adverse
Brabazon Roundabout (Site Access, Southern Arm)	NB	161%	Substantial	Negligible	Minor Adverse
Concorde Roundabout	NB	33%	Minor	Medium	Minor Adverse
Concorde Roundabout	WB	31%	Minor	High	Minor Adverse
Hayes Way (Between Concorde Roundabout and Blenheim Roundabout)	WB	33%	Minor	High	Minor Adverse
Hayes Way / A38 Signalised Gyratory	EB	83%	Moderate	Low	Minor Adverse

Lysander Road (south of Merlin Road Roundabout)	WB	60%	Moderate	Medium	Minor Adverse
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Table 8.38: Links in the PM Peak with an Increase in Vehicle Movements of more than 30%

Link	Direction	% Change	Magnitude of Impact	Receptor Sensitivity	Significance of Effect
Blenheim Roundabout (Site Access, Southern Arm)	SB	54%	Minor	Negligible	Negligible
Brabazon Roundabout (Site Access, Southern Arm)	NB	62%	Moderate	Negligible	Negligible

8.8.9 As shown above, all eight links in the AM peak result in a **minor adverse** significance of effect and both links in the PM peak result in a **negligible** significance of effect. Therefore, it is considered that the impact of the complete and operational Proposed Development without Concorde Roundabout and Combination Junction on severance is **not significant**.

Driver Delay

8.8.10 For assessing the impact on driver delay, the receptor is the highway links of the highway network in the study area. As shown in **Table 8.8**, sensitivity of links is based on their volume to capacity ratio (V/C).

8.8.11 **Table 8.39** Error! Reference source not found. and **Table 8.40** Error! Reference source not found. show the impact on link V/Cs in the AM peak and PM peak, respectively, for the Proposed Development without Combination Junction and Concorde Roundabout. Percentage change in traffic flows that are not negligible (greater than 30%) are highlighted in orange.

Table 8.39: 2036 Link Driver Delay – AM Peak Traffic Flows for Proposed Development (without Combination Junction and Concorde Roundabout)

Location	Direction	V/C Ratio		Receptor Sensitivity	% Change in Traffic
		2036 Baseline	2036 Baseline with Proposed Development (without Combination Junction and Concorde Roundabout)		
A38 (Hayes Way / Gloucester Road Gyratory)	NB	52%	53%	Negligible	2%

Location	Direction	V/C Ratio		Receptor Sensitivity	% Change in Traffic
		2036 Baseline	2036 Baseline with Proposed Development (without Combination Junction and Concorde Roundabout)		
A38 (North of Proposed Access)	NB	27%	29%	Negligible	8%
A38 (South of Signalised Gyratory)	NB	27%	32%	Negligible	17%
A38 / Hayes Way Signalised Gyratory	NB	35%	40%	Negligible	17%
B4057 (South of Stoke Lane)	WB	29%	33%	Negligible	12%
Blenheim Roundabout (Site Access, Southern Arm)	SB	20%	51%	Negligible	151%
Brabazon Roundabout (Site Access, Southern Arm)	SB	3%	13%	Negligible	303%
Brabazon Roundabout (Site Access, Southern Arm)	NB	13%	33%	Negligible	161%
Concorde Roundabout	WB	30%	40%	Negligible	33%
Concorde Roundabout	EB	3%	12%	Negligible	31%
Filton Avenue	WB	2%	2%	Negligible	26%
Gloucester Road (South of Junction with Muller Road)	SB	22%	22%	Negligible	1%
Hayes Way (Between Brabazon Roundabout and San Andreas Roundabout)	WB	53%	63%	Negligible	19%

Location	Direction	V/C Ratio		Receptor Sensitivity	% Change in Traffic
		2036 Baseline	2036 Baseline with Proposed Development (without Combination Junction and Concorde Roundabout)		
Hayes Way (Between Concorde Roundabout and Blenheim Roundabout)	WB	61%	81%	Medium	33%
Hayes Way (Between San Andreas Roundabout and Merlin Road)	EB	34%	42%	Negligible	25%
Hayes Way (East of Concorde Roundabout)	NB	5%	5%	Negligible	9%
Hayes Way / A38 Signalised Gyratory	EB	17%	31%	Negligible	83%
Highwood Road	NB	67%	86%	Medium	28%
Highwood Road (Western Arm)	WB	13%	15%	Negligible	10%
Highwood Road Gyratory (Western Arm)	EB	27%	30%	Negligible	11%
Lysander Road	WB	20%	24%	Negligible	21%
Lysander Road	EB	16%	18%	Negligible	11%
Lysander Road (north of Merlin Road Roundabout)	NB	13%	8%	Negligible	0%
Lysander Road (north of Merlin Road Roundabout)	SB	18%	21%	Negligible	17%
Lysander Road (south of Merlin Road Roundabout)	WB	9%	15%	Negligible	60%

Location	Direction	V/C Ratio		Receptor Sensitivity	% Change in Traffic
		2036 Baseline	2036 Baseline with Proposed Development (without Combination Junction and Concorde Roundabout)		
Merlin Road (to the east of Merlin road / Lysander Road Roundabout)	EB	23%	26%	Negligible	14%
Merlin Road (to the west of San Andreas roundabout)	EB	42%	47%	Negligible	18%
San Andreas Roundabout	EB	59%	71%	Low	19%
San Andreas Roundabout (Merlin Road to Highwood Road)	NB	59%	81%	Medium	29%
The Laurels	WB	21%	24%	Negligible	12%

Table 8.40: 2036 Link Driver Delay – PM Peak Traffic Flows for Proposed Development (without Combination Junction and Concorde Roundabout)

Location	Direction	V/C Ratio		Receptor Sensitivity	% Change in Traffic
		2036 Baseline	2036 Baseline with Proposed Development (without Combination Junction and Concorde Roundabout)		
A38 (Hayes Way / Gloucester Road Gyratory)	NB	42%	51%	Negligible	18%
A38 (North of Proposed Access)	NB	24%	29%	Negligible	20%

Location	Direction	V/C Ratio		Receptor Sensitivity	% Change in Traffic
		2036 Baseline	2036 Baseline with Proposed Development (without Combination Junction and Concorde Roundabout)		
A38 (South of Signalised Gyratory)	NB	25%	33%	Negligible	25%
A38 / Hayes Way Signalised Gyratory	NB	32%	42%	Negligible	25%
B4057 (South of Stoke Lane)	WB	31%	32%	Negligible	5%
Blenheim Roundabout (Site Access, Southern Arm)	SB	13%	42%	Negligible	54%
Brabazon Roundabout (Site Access, Southern Arm)	SB	30%	24%	Negligible	-17%
Brabazon Roundabout (Site Access, Southern Arm)	NB	12%	31%	Negligible	62%
Concorde Roundabout	WB	43%	49%	Negligible	11%
Concorde Roundabout	EB	43%	48%	Negligible	12%
Filton Avenue	WB	1%	1%	Negligible	9%
Gloucester Road (South of Junction with Muller Road)	SB	10%	12%	Negligible	10%
Hayes Way (Between Brabazon Roundabout and San Andreas Roundabout)	WB	33%	37%	Negligible	11%
Hayes Way (Between Concorde Roundabout and Blenheim Roundabout)	WB	90%	101%	High	11%
Hayes Way (Between San Andreas Roundabout and Merlin Road)	EB	47%	49%	Negligible	3%

Location	Direction	V/C Ratio		Receptor Sensitivity	% Change in Traffic
		2036 Baseline	2036 Baseline with Proposed Development (without Combination Junction and Concorde Roundabout)		
Hayes Way (East of Concorde Roundabout)	NB	15%	14%	Negligible	-7%
Hayes Way / A38 Signalised Gyratory	EB	33%	43%	Negligible	23%
Highwood Road	NB	42%	46%	Negligible	10%
Highwood Road (Western Arm)	WB	25%	26%	Negligible	5%
Highwood Road Gyratory (Western Arm)	EB	52%	55%	Negligible	5%
Lysander Road	WB	64%	68%	Negligible	4%
Lysander Road	EB	37%	38%	Negligible	4%
Lysander Road (north of Merlin Road Roundabout)	NB	31%	35%	Negligible	11%
Lysander Road (north of Merlin Road Roundabout)	SB	27%	27%	Negligible	-2%
Lysander Road (south of Merlin Road Roundabout)	WB	41%	42%	Negligible	2%
Merlin road (to the east of Merlin road / Lysander Road Roundabout)	EB	50%	50%	Negligible	1%
Merlin Road (to the west of San Andreas roundabout)	EB	101%	100%	High	0%
San Andreas Roundabout	EB	37%	41%	Negligible	11%
San Andreas Roundabout (Merlin Road to Highwood Road)	NB	48%	52%	Negligible	5%

Location	Direction	V/C Ratio		Receptor Sensitivity	% Change in Traffic
		2036 Baseline	2036 Baseline with Proposed Development (without Combination Junction and Concorde Roundabout)		
The Laurels	WB	20%	29%	Negligible	29%

- 8.8.12 In a scenario without Concorde Roundabout and Combination Junction, **Table 8.39Error! Reference source not found.** and **Table 8.40Error! Reference source not found.** show that in the peak hours, most of the links assessed would bring about a negligible change in vehicle movements (less than 30%) as a result of the Proposed Development. Driver delay is subject to the same thresholds as severance with less than a 30% change in vehicle flows resulting in a negligible magnitude of impact on driver delay.
- 8.8.13 For the eight links in the AM peak and two links in the PM peak where the percentage change in traffic flow is greater than 30%, the receptor sensitivity, magnitude of impact and resulting significance of effect are listed in **Table 8.41Error! Reference source not found.** for the AM peak and **Table 8.42Error! Reference source not found.** for the PM peak.

Table 8.41: Links in the AM Peak with an Increase in Vehicle Movements of more than 30%

Link	Direction	% Change	Receptor Sensitivity	Magnitude of Impact	Significance of Effect
Blenheim Roundabout (Site Access, Southern Arm)	SB	151%	Negligible	Substantial	Minor Adverse
Brabazon Roundabout (Site Access, Southern Arm)	SB	303%	Negligible	Substantial	Minor Adverse
Brabazon Roundabout (Site Access, Southern Arm)	NB	161%	Negligible	Substantial	Minor Adverse
Concorde Roundabout	NB	33%	Negligible	Minor	Negligible
Concorde Roundabout	WB	31%	Negligible	Minor	Negligible
Hayes Way (Between Concorde Roundabout and Blenheim Roundabout)	WB	33%	Medium	Minor	Minor Adverse

Hayes Way / A38 Signalised Gyratory	EB	83%	Negligible	Moderate	Negligible
Lysander Road (south of Merlin Road Roundabout)	WB	60%	Negligible	Moderate	Negligible

Table 8.42: Links in the PM Peak with an Increase in Vehicle Movements of more than 30%

Link	Direction	% Change	Receptor Sensitivity	Magnitude of Impact	Significance of Effect
Blenheim Roundabout (Site Access, Southern Arm)	SB	54%	Negligible	Minor	Negligible
Brabazon Roundabout (Site Access, Southern Arm)	NB	62%	Negligible	Moderate	Negligible

- 8.8.14 As shown above, four links in the AM peak result in a **minor adverse** significance of effect with the remaining four links result in a **negligible** significance of effect, and both links in the PM peak result in a **negligible** significance of effect. Therefore, it is considered that the impact of the complete and operational Proposed Development without Combination Junction and Concorde Roundabout on driver delay is **not significant**.

Pedestrian and Cyclist Delay

- 8.8.15 For assessing the impact on pedestrian and cyclist delay, the receptors are pedestrians and cyclists that are living in or visiting the Proposed Development and thus using the links within the study area. As shown in Table 8.8, sensitivity of pedestrians and cyclists are based on the level of infrastructure provided on the surrounding highway network. The highway links that are assessed have segregated pavements and designated pedestrian crossing within a reasonable walking distance, with marked cycle lanes at some links. Therefore, the highway links assessed are considered to have an overall average quality pedestrian and cycle infrastructure. As a result, pedestrians and cyclists would have a medium sensitivity.
- 8.8.16 In a scenario without Concorde Roundabout and Combination Junction, as shown in Table 8.35 **Error! Reference source not found.** and Table 8.36 **Error! Reference source not found.**, the Proposed Development would bring about some increases in the number of vehicles movements in the AM Peak and PM Peak, which would have the potential to increase the delay of pedestrians and cyclists seeking to cross roads. However, given the 15m wide pedestrian boulevard proposed as part of this application, the segregation of cycle lanes throughout the Site and the increased pedestrian permeability resulting from the expansion of Brabazon Park, the improvements in pedestrian and cyclist infrastructure would result in a moderate beneficial effect.
- 8.8.17 Therefore, given the medium sensitivity of the receptors, it is considered that the effect of the complete and operational Proposed Development without Concorde Roundabout and Combination Junction on pedestrian and cyclist delay is **moderate beneficial (significant)**.

Pedestrian and Cyclist Amenity

- 8.8.18 For assessing the impact on pedestrian and cyclist amenity, the receptors are pedestrians and cyclists that are living in or visiting the Proposed Development and thus using the links in the study area. As outlined above in Paragraph 8.8.15, pedestrians and cyclists would have a medium sensitivity.
- 8.8.19 In a scenario without Concorde Roundabout and Combination Junction, as shown in **Table 8.35Error! Reference source not found.** and **Table 8.36Error! Reference source not found.**, the Proposed Development would bring about some increases in the number of vehicles movements in the AM Peak and PM Peak, which would have the potential to impact pedestrian and cyclist amenity. However, given the 15m wide pedestrian boulevard in the Proposed Development, the segregation of cycle lanes throughout the Site and the increased pedestrian permeability resulting from the expansion of Brabazon Park, the improvements in pedestrian and cyclist infrastructure would result in a moderate beneficial effect.
- 8.8.20 Therefore, given the medium sensitivity of the receptors, it is considered that the effect of the complete and operational Proposed Development without Concorde Roundabout and Combination Junction on pedestrian and cyclist amenity is **moderate beneficial (significant)**.

Fear and Intimidation

- 8.8.21 For assessing the impact on fear and intimidation, the receptors are pedestrians and cyclists that are living in or visiting the Proposed Development and thus using the links in the study area. As outlined in **Paragraph 8.8.15**, pedestrians and cyclists would have a moderate sensitivity.
- 8.8.22
- 8.8.23
- 8.8.24 **Table 8.43Error! Reference source not found.** shows the change in average hourly vehicle flows over an 18-hour period from the 2036 Baseline to the 2036 Baseline with Proposed Development without Concorde Roundabout and Combination Junction.

Table 8.43: 2036 Baseline vs. 2036 Baseline with Proposed Development (without Combination Junction and Concorde Roundabout) - Average Hourly (based on 18-hour AAWT) Traffic Flows

Location	Direction	2036 Baseline 18hr Avg Flow	2036 Baseline with Proposed Development (without Combination Junction and Concorde Roundabout) 18hr Avg Traffic Flows	Change in Flow
A38 (Hayes Way / Gloucester Road Gyratory)	NB	503	558	55
A38 (North of Proposed Access)	NB	1013	1175	162

Location	Direction	2036 Baseline 18hr Avg Flow	2036 Baseline with Proposed Development (without Combination Junction and Concorde Roundabout) 18hr Avg Traffic Flows	Change in Flow
A38 (South of Signalised Gyratory)	NB	675	844	169
A38 / Hayes Way Signalised Gyratory	NB	675	844	169
B4057 (South of Stoke Lane)	WB	144	156	12
Blenheim Roundabout (Site Access, Southern Arm)	SB	164	390	226
Brabazon Roundabout (Site Access, Southern Arm)	SB	112	144	32
Brabazon Roundabout (Site Access, Southern Arm)	NB	88	230	142
Concorde Roundabout	WB	998	1207	209
Concorde Roundabout	EB	930	1124	194
Filton Avenue	WB	17	20	3
Gloucester Road (South of Junction with Muller Road)	SB	280	292	11
Hayes Way (Between Brabazon Roundabout and San Andreas Roundabout)	WB	826	963	137
Hayes Way (Between Concorde Roundabout and Blenheim Roundabout)	WB	998	1207	209
Hayes Way (Between San Andreas Roundabout and Merlin Road)	EB	699	784	85
Hayes Way (East of Concorde Roundabout)	NB	65	63	-2
Hayes Way / A38 Signalised Gyratory	EB	373	554	180
Highwood Road	NB	652	787	135

Location	Direction	2036 Baseline 18hr Avg Flow	2036 Baseline with Proposed Development (without Combination Junction and Concorde Roundabout) 18hr Avg Traffic Flows	Change in Flow
Highwood Road (Western Arm)	WB	303	323	20
Highwood Road Gyratory (Western Arm)	EB	285	305	20
Lysander Road	WB	510	552	42
Lysander Road	EB	680	724	44
Lysander Road (north of Merlin Road Roundabout)	NB	197	193	-4
Lysander Road (north of Merlin Road Roundabout)	SB	359	381	22
Lysander Road (south of Merlin Road Roundabout)	WB	344	388	45
Merlin road (to the east of Merlin road / Lysander Road Roundabout)	EB	997	1047	49
Merlin Road (to the west of San Andreas roundabout)	EB	805	856	51
San Andreas Roundabout	EB	826	963	137
San Andreas Roundabout (Merlin road to Highwood Road)	NB	754	867	113
The Laurels	WB	150	190	40

8.8.25 In a scenario without Combination Junction and Concorde Roundabout, as shown in

8.8.26

8.8.27 **Table 8.43****Error! Reference source not found.**, the Proposed Development would not generate a change in hourly flow of more than 600 vehicles, resulting in a negligible magnitude of impact. Given the moderate sensitivity of the receptors, all links will result in a **negligible** significance of effect and therefore it is considered that the impact of the complete and operational Proposed Development without Concorde Roundabout and Combination Junction on fear and intimidation is **not significant**.

Accidents and Safety

8.8.28 As outlined in **Paragraph 8.5.23 to 8.5.26**, in the Site vicinity, the majority of accidents have taken place on and around the following junctions:

- Cribbs Causeway interchange to the north-west of the Site
- Merlin Road / Lysander Road to the north of the Site
- Filton Roundabout on the A38 to the south-east of the Site

8.8.29 No links on and within 25m of the approach of the Cribbs Causeway interchange experience a 10% or greater increase in traffic and therefore these links receive a negligible impact on receptors of varying sensitivities.

8.8.30 No links on and within 25m of the approach of Filton Roundabout experience a 10% or greater increase in traffic and therefore these links receive a negligible impact on receptors of varying sensitivity.

8.8.31 Some links on and within 25m of the approach of the junction of Merlin Road and Lysander Road experience a 10% or greater increase in traffic. Further to the quantitative analysis of traffic flows, a qualitative analysis of the relevant collision descriptions indicate that the accidents at the junction were caused by vehicle approaching the roundabout. Therefore, the increase in traffic levels at the links approaching the junction are summarised below in Table 8.44 **Error! Reference source not found..**

Table 8.44: Summary of Change in Traffic Flow at Assessed Links on Brabazon Roundabout

Location	Direction	AM Peak		PM Peak	
		% Change in Traffic	Magnitude of Impact	% Change in Traffic	Magnitude of Impact
Lysander Road	EB	11%	Negligible	4%	Negligible
Lysander Road (north of Merlin Road Roundabout)	SB	17%	Minor Adverse	-2%	Negligible
Merlin Road (east of Merlin Road / Lysander Road Roundabout)	EB	14%	Negligible	1%	Negligible

8.8.32 The percentage change in traffic at the Lysander Road eastbound link results in a negligible magnitude of impact in both the AM peak and PM peak. As Lysander Road has a segregated pavement but no cycle lane, and all accidents were categorised as slight accidents, the receptor sensitivity is identified as low. Therefore, the significance of effect would be negligible in both the AM and PM peak.

8.8.33 The percentage change in traffic at the Lysander Road (north of Merlin Road Roundabout) southbound link results in a minor magnitude of impact in the AM peak and a negligible magnitude of impact in the PM peak. As this section of the highway has a segregated pavement but no cycle lane, and all accidents were categorised as slight accidents and

involved vehicles only, the receptor sensitivity is identified as low. Therefore, the significance of effect would be **minor adverse** in the AM peak and negligible in the PM peak.

- 8.8.34 The percentage change in traffic at the Merlin Road (east of Merlin Road / Lysander Road Roundabout) eastbound link results in a negligible magnitude of impact in both the AM and PM peak. As this section of the highway has a segregated pavement but no cycle lane, and all accidents were categorised as slight accidents, and involved vehicles only, the receptor sensitivity is identified as low. Therefore, the significance of effect would be negligible in both the AM and PM peak.
- 8.8.35 Based on the above, it is considered that the impact of the complete and operational Proposed Development without Concorde Roundabout and Combination Junction on accidents and safety is **not significant** as the significance of effect across the highway links ranges from negligible to minor adverse.

8.9 Further Mitigation and Enhancement

Operational Development

Travel Plan

- 8.9.1 Travel plans are one of the primary tools for mitigating the transport impacts of a Proposed Development and to encourage travel by sustainable and active modes. A Framework Travel Plan is provided in Appendix B of the Transport Assessment (Appendix C.1) and provides mode share targets for each Transport Phase and Site-specific targets which would be developed upon occupation of the Site.
- 8.9.2 A Full Travel Plan would be targeted to be developed within six months of the commencement of Transport Phase 1, once it is fully understood how and why people travel to and from the Proposed Development.
- 8.9.3 The travel plan will mitigate potential adverse effects measured by traffic increases as the travel plan aims to reduce overall long-term vehicular traffic by encouraging mode shift to walking, cycling and public transport, and therefore reduce the number of vehicular traffic generated by the Proposed Development. However, this will not have a direct impact on the assessed environmental effects and therefore is not included to mitigate any of the conclusions made.

8.10 Residual Effects

Operational Development

- 8.10.1 The residual effects resulting from the Proposed Development are summarised in Table 8.45 for each Transport Phase, respectively.

Table 8.45: Summary of Residual Effects

Description of Effect	Scale and Nature	Significance	Geo	D/I	P/T	St/Mt/Lt
Severance	Minor Adverse	Not Significant	Local	D	P	Lt
Pedestrian / Cyclist Delay	Moderate Beneficial	Significant	Local	D	P	Lt

Pedestrian / Cyclist Amenity		Moderate Beneficial	Significant	Local	D	P	Lt
Fear and Intimidation		Negligible	Not Significant	Local	D	P	Lt
Accidents and Safety		Minor Adverse	Not Significant	Local	D	P	Lt
Driver Delay		Minor Adverse	Not Significant	Local	D	P	Lt
Public Transport Capacity - Bus	TP1	Minor Adverse	Not Significant	District	D	P	Lt
	TP2	Moderate Adverse	Not Significant				
	TP3	Substantial Adverse	Significant				
	TP4	Minor Adverse	Not Significant				
Public Transport Capacity - MRT	TP1	Minor Adverse	Not Significant	District	D	P	Lt
	TP2	Minor Adverse	Not Significant				
	TP3	Minor Adverse	Not Significant				
	TP4	Minor Adverse	Not Significant				
Public Transport Capacity - Rail	TP1	Minor Adverse	Not Significant	District	D	P	Lt
	TP2	Minor Adverse	Not Significant				
	TP3	Minor Adverse	Not Significant				
	TP4	Minor Adverse	Not Significant				
Public Access		Major Beneficial	Significant	Local	D	P	Lt
Notes: TP = Transport Phase Scale = Negligible / Minor / Moderate / Major / Substantial Nature = Beneficial or Adverse Significance = Significant or Not Significant Geographic Extent (Geo) = Local / District / Sub-Regional / Regional / National / International D/I = Direct or Indirect P/T = Permanent or Temporary St/Mt/Lt = Short-term/Medium-term/Long-term							

8.10.2 The operational development of the Proposed Development results in adverse residual significant effects for public transport capacity on the bus network at Transport Phase 3 and this would be managed through the forthcoming ES which would be prepared and submitted prior to the delivery of Phase 3 and the associated impacts. This ES would reflect the latest public transport background demand and enhancement proposals at the time,

- 8.10.3 Further, the operational development of the Proposed Development also results in beneficial residual significant effects for the pedestrian and cyclist delay and amenity, and public access.
- 8.10.4 All other impacts result in a negligible or minor adverse effect and are therefore not significant.
- 8.10.5 The effects resulting from the sensitivity analysis of the Proposed Development without Concorde Roundabout and Combination Junction as access points to the Site are the same as the conclusions set out in Table 8.45 and therefore present the same residual effects.

8.11 Monitoring

- 8.11.1 Significant effects are observed in Transport Phase 3 across all three scenarios for bus capacity and in Transport Phase 1 for the PM Peak with Arena trips for rail capacity. As this OPA is being considered on the basis of the forecasted public transport demand as Transport Phases 1 and 2 only, this residual effects will be considered at a later stage with suitable mitigation and appropriate monitoring agreed if required.
- 8.11.2 It is also worth noting that the effect is negligible and not significant across Transport Phases 1 and 2 in the AM Peak and PM Peak which is considered the core assessment as Transport Phases 3 and 4 would be reassessed and the PM Peak with Arena scenario would occur no more than 26 times a year and has been provided as a conservative assessment.
- 8.11.3 It should also be noted that, as discussed with SGC during the pre-application consultation period and set out in the Transport Scoping Note (submitted to SGC on 11/02/2022), the public transport capacity at Transport Phases 3 and 4 will be reassessed and agreed prior to delivery of the associated densification. Should the impact remain significant, mitigation measures would be identified and agreed as part of this reassessment.
- 8.11.4 In addition, the demand on the public transport network resulting from Arena trips in the PM peak would be reviewed by YTL before each major event and monitored as part of the Arena Monitoring Programme, which forms part of the Event Management Strategy secured as part of the Planning Conditions for the YTL Arena consented application.
- 8.11.5 Furthermore, the Travel Plan will be monitored by the appointed Travel Plan Coordinator who will implement a programme to survey travel patterns and evaluate the success of the plan. Travel Plans are normally monitored on a five-year cycle and surveys would also be conducted during each transport phase to ensure that the mode share targets are met throughout the phases.
- 8.11.6 No other significant residual adverse effects have been identified in this assessment therefore no monitoring is required.